LIBRARY OF CONG...
MAR 14 1911
SMITHSONIAN DEPOSIT.

THE AMERICAN

# GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME XCIV., No. 11. Whole No. 1,866. | NEW YORK, MONDAY, MARCH 13, 1911. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. H. WADELTON, Manager.
THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

## CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

OFFICIAL NOTICES—
Annual Meeting, Illinois Gas Association..... 497
Third Meeting, Southern Gas Association..... 497
Seventh Meeting, Southwestern Electrical and Gas Association... 497
Annual Meeting, Wisconsin Gas Association..... 497
EDITORIALS—
Briefly Told..... 498
Efficiency—The Coming Meeting of the Southwestern Gas and Electric Association—Death of Mr. Frederick C. Kniese—March Meeting, New York Section, Illuminating Engineering Society.
Publications..... 498
*The Amber Light Campaign in Chicago, Ills., by Mr. T. R. Beebe. 499
Proceedings, Sixth Annual Meeting, National Commercial Gas Association—Continued from Page 456..... 499
Third Day, Morning Session—Discussion on the Wainwright Paper—Rates, by Mr. H. L. Doherty.
Proceedings, Third Annual Meeting, Indiana Gas Association—Continued from Page 460..... 504
First Day, Morning Session—Discussion on the Eves Paper—Miss M. Wilcut's Experiences as a Demonstrator—Experiences by Mrs. D. A. Hawkins—*The Relations of Heating Value to Candle Power in Commercial Water and Coal Gas, by Mr. J. W. Dunbar and Mr. A. B. Davis.
*Latest Type of the Welsbach Junior, by Mr. W. L. Day..... 510
ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 510
Contract for the Parker-Russell Folks—Will Salmon City, Idaho, Have a Gas Plant?—Personal—Nantucket (Mass.) Emits a Wail—The Huntsville (Ala.) Plant Changes Hands—Mr. Montgomery Takes Charge at Northampton, Mass.—The Taylorsville (Ills.) Contention at an End—Mr. Little on Painting—Mr. John Connolly Will Recover—Gas Employees' Association, Bangor, Me.—Death of Mr. W. R. Perry—New Lamp Post, Western Gas Construction Company—Personal—Quakertown (Pa.) Wants Gas—Public Lighting, Boston, Mass.—The Columbia Gas and Electric Co.—A Dinner that was a Good One—The Fall River (Mass.) Works Employees' Association—New Rate, Racine, Wis.—Taxing the Gas Mains—Gas Rates, Guayaquil, S. A.—And Other Items.
The Market for Gas Securities..... 512
Public Lighting Table for March, 1911..... 522
Meeting Times of the Various Gas Associations..... 523

[OFFICIAL NOTICE.]

### Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
ELGIN, ILLS., Feb. 6, 1911.

To the Members, Illinois Gas Association: The annual meeting of the Illinois Gas Association will be held in the Auditorium Hotel, Chicago, Ills., March 15th and 16th, 1911. The banquet will be held the evening of March 15th.

As soon as the papers, etc., have been decided upon, the information will be forwarded. Yours truly, C. B. STROHN, Secretary.

[OFFICIAL NOTICE.]

### Third Meeting, Southern Gas Association.

OFFICE OF THE SECRETARY,
SOUTHERN GAS ASSOCIATION,
ROME, GA., Feb. 25, 1911.

The third meeting of the Southern Gas Association will be held in Montgomery, Ala., on the 19th, 20th and 21st of April next. The convention headquarters will be in the Exchange Hotel, that city.

Hotel rates are quoted as follows:

Exchange Hotel: Single room, with bath, $1.50 to $3.50; double room, with bath, $2.50 to $5.

Gay League Hotel: Single room, with bath, $1.50 to $2; double room, with bath, $2 to $3.

The following papers have been promised:

"Retort House Practice," by Mr. E. C. Beach, Little Rock, Ark.
"Gas Lighting," by Mr. J. N. Cooke, Jacksonville, Fla.
"Maintenance Household Appliances," by Mr. F. G. Dean, Atlanta, Ga.
"The All-Gas Kitchen," by Mr. G. M. Howsmon, Mobile, Ala.
"Advertising," by Mr. Albert B. Kelly, Philadelphia, Pa.
"My Hardest Proposition in the Gas Business," by Mr. W. G. Leet, Greenville, Miss.
"Water Heaters," by Mr. W. J. McCortney, Kalamozoo, Mich.
"Industrial Appliances, by Mr. G. W. McKee, Rockford, Ills.
"Laboratory Records in Works Economy," by Mr. R. M. Redding, Macon, Ga.
"Purchasing Ethics," by Mr. J. C. Rushin, Atlanta, Ga.
"High Pressure Distribution," by Mr. F. H. Sawyer, New Bern, N. C.
"Street Mains and Service Construction Policy, by Mr. K. L. Simons, Birmingham, Ala.
"Starting a Gas Company, by Mr. J. C. Storm, Amarillo, Tex.
"The Relation of Departments, New Business and Distribution," by Mr. Geo. Williams, New York City.
"Shop Management," by Mr. A. W. Young, Knoxville, Tenn.

Negotiations with Passenger Associations regarding rates of transportation are now pending. The result of these will be announced later. JAMES FERRIER, Secretary.

[OFFICIAL NOTICE.]

### Seventh Meeting, Southwestern Electrical and Gas Association.

SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION,
1316 COMMERCE ST., DALLAS, TEX., Jan. 29, 1911.

To the Members, Southwestern Electrical and Gas Association: At a called meeting of the Advisory and Executive Committees of the Soutwestern Electrical and Gas Association, it was decided to hold the Seventh Annual Convention of the Association in Houston, Tex., April 27, 28 and 29, 1911. D. G. FISHER, Secretary.

[OFFICIAL NOTICE.]

### Annual Meeting, Wisconsin Gas Association.

WISCONSIN GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
MILWAUKEE, March 4, 1911.

To members of the Wisconsin Gas Association: The annual meeting of the Wisconsin Gas Association will be held in Milwaukee on May 17-18th, 1911, and it is planned to devote a considerable portion of the time to the subject of "Efficiency Engineering" or "Scientific Management." This new profession, which has already received so much publicity in connection with the railroad rate hearing, is, of course (to some extent), only an old friend with a new title, gopoing, as it does, to develop net earnings by scientific management and exact methods, instead of by the hit-or-miss methods in common use.

We are all, in a sense, trying to be efficiency engineers, in that we are constantly working to increase earnings and keep down expenses, eliminate friction and lost motion in men and machines, promote cooperation, etc., and if the efficiency engineer can enable us to do all this in a better and surer way we certainly can use him.

Some of us—perhaps most of us—have been wondering whether or not an expert analysis of our organizations and methods would disclose possibilities of profit development to which we are blind from long contact and habit, and it has been thought that, if we should all get together next May, prepared to contribute to a discussion of the matter, considerable light would be thrown on the subject. It is suggested that each member keep the matter in mind and try to bring to the meeting a statement of at least one thing he has accomplished, or hopes to accomplish, to increase efficiency, and such questions as to how improvements can be made, as have suggested themselves to him.

The matter is brought to your attention at this early date, with the hope that you will think it of considerable importance to warrant giving it some thought, and with the further hope that you will write, stating your opinion of the plan and making any suggestions which occur to you.

We need the help of every member, even if it can go no further than sending in a question for the meeting to discuss and, if possible, to answer.

Articles on "Scientific Management" may be found in the February number of "The World's Work" and in the March numbers of "System," "The Century" and the "American Magazine."

Soliciting your kind co-operation toward the success of our next meeting along the lines above suggested, I remain,

Yours truly, W. H. Winslow, President.

## BRIEFLY TQLD.

Efficiency.—The gas industry has been well nigh surfeited with the clamors for greater efficiency in the methods of obtaining new business. Commercial "engineering" has even been applied as a cognomen for some of these activities, yet, with all this, the basis of these efforts has hardly been commented upon. Industrial methods in all lines and in all countries have been undergoing a great change and a rapid development in the past decade, and the scope of these has included the factory, the office, even the home. One of the self-appointed guardians of our national welfare has claimed that the railroads could save $300,000,000 a year by adopting better methods. Another man of a different type has reorganized the methods used in bricklaying, and the results of his work are now available in book form, the title being "Motion Study." Not an euphonious title, but nevertheless a true one. The many systems brought out for handling correspondence and reports are but a branch of motion study, and these are sometimes laughed at as being cumbersome and unnecessary. As an example of one of the simple records which will bear scrutiny let us take the book which is closest to the consumer, the complaint book. In how many cases hrs this record been adopted in triplicate form so that unnecessary motions and annoyance can be avoided, and the customers' needs handled with promptness and dispatch. In the engineering and standard sizes for tracing filed flat and card indexed would be a beginning toward efforts in the larger and more important field of labor connected with actual construction work. Improved methods are of even greater importance than improved machinery, although both are necessary to success.

The Coming Meeting of the Southwestern Gas and Electrical Association.—No matter what the outcome of the "trouble over the border" in Mexico may be, it is a certainty that the meeting this year of the Southwestern Electrical and Gas Association, to be held April 27 to 29 inclusive, in historical old Houston, will be a rousing, good success. President Tuttle, ably assisted by Secretary Fisher and Chairman Dunbar, have been adjusting the preliminaries. The meeting will be held in the beautifully arranged modern structure known as the City Auditorium, and it is also determined that an exhibition of gas and electric appliances, on a scale exceeding even that of a year ago—and that show was a most attractive one—is assumed. Mr. Morton B. Wheeler is Chairman of the Committee on Exhibits, and those Eastern manufacturers (using the word Eastern to cover all territory this side of St. Louis) are asked to communicate with him regarding the taking of space. Special railroad rates have been allowed. It goes without saying that our Texas brothers are "soulful entertainers," in which knowledge his assurance that the social features will be on a scale with the "bigness" of Texas in every way.

Death of Mr. Frederick C. Kniese.—We are indebted to Mr. Frederic Egner for the following information respecting the death of Mr. Frederick C. Kniese, who passed away at an hospital in Baltimore, Md., the morning of the 1st inst. Deceased was a native of Denmark, a son of an officer in the Danish army, and first became known to Mr. Egner when the latter met him in the works of the Troy (N. Y.) Gas Light Company, in June, 1877. He was foreman of works at the time, the Engineer-in-Chief being Mr. F. A. Sabbaton of beloved memory. Later on Mr. Kniese had charge of the works of the Citizens Gas Light Company, of Newark, N. J., which Company was under the dominion of a man named Smalley, and although Smalley's reputation was such that men rarely failed to make long stays under his direction, "Fred." Kniese managed to stick it out, until an urgent call from Baltimore, in which city the marauders who found the Chesapeake Gas Light Company were in much trouble through their inability to run a plant in anything like good, successful method. They knew more about printing bonds than they did about charging generators. As usual Kniese made good in Baltimore. Then came the absorption of the Chesapeake Company, and right afterwards the Katzenberger invasion of Memphis. Kniese took charge of the construction of the Equitable Company for that syndicate, and afterwards managed it so well that when the inevitable consolidation took place, it went into the old Memphis Company "at a good figure." It was then and there that the celebrated "Baby Process" of the late celebrated Ezram Jerzmanowski was tried out. In this Memphis deal Mr. Kniese thoroughly learned the lesson of how ungrateful capitalist of a certain kind can be. Disgusted and better informed he left the gas business and journeyed back to Baltimore, where he engaged in the business of restaurant keeper. His modest hostelry was going along smoothly and well, when along came the terrible conflagration that dealt death and disaster to so many. This contretemps completely wiped out his capital, and back to his profession he returned. He engaged with the Butte (Mont.) Gas Light and Fuel Company, and, out of the chaos then rampant in the gas supply of Butte, he soon brought order that led to profitable operation. A noteworthy phase of his work in Butte was his successful struggle with labor unionism, respecting which contention or strife his success was complete. About 3 months ago Mr. Kniese was taken ill, and he sought relief from disease (he suffered from nephritic trouble) at the Boulder (Mont.) Hot Springs. Even at as late a day as mid-February it was thought his recovery was certain; but the mysteries of nephritic ills are many, and death came to him in great suddenness the day noted. The funeral ceremonies were held in the home of his daughter, 1912 W. Lonsdale street, immediately after the removal of his body from the hospital. And in taking final leave of him, it is well to know that Mr. Egner (who knew him long and intimately) writes of him: "Mr. Kniese was a man of superior ability and of sterling integrity!" Could grander meed of praise be given to anyone?

March Meeting, New York Section, Illuminating Engineering Society.—The lighting of a large store was the title of the paper read before the New York Section of the Illuminating Society on the evening of the 9th inst., the meeting being held in the building described in the paper, Messrs. Gimbel Brothers Dry Goods Store.

Three types of lighting equipment, none of which the authors commended wholly, are used throughout the building.

While the attendance numbered nearly 200, comparatively few were connected with the Society, and owing to the large number of guests present, the discussion did not cover the points involved, as would have been the case otherwise.

The main floor of the building appears to be over-lighted, which is probably due to the fact that not only more light is used, but that the ceilings, walls and pillars are of a clear white. Most of discussion centered around this feature of lighting, and those entering into the same were Messrs. Millar, Codman, Ashe, Macbeth, Owens and Stickney.

## Publications.

*Motion Study.*—A timely book covering one phase of "Efficiency Engineering;" 5¼ by 7¾ inches; 135 pp.; 44 illustrations. By Mr. Frank B. Gilbreth; with introduction by Prof. Robert Thurston Kent. Published by D. Van Nostrand Co. Price, $2.

The author has investigated and developed the "efficiency" idea in the construction of buildings in a successful manner, and the examples used in this short study are taken from the building trade. The subject used undoubtedly accounts for the fact that his work has not received the attention accorded the remarks of those exploiters who "talk in millions."

*The Stone & Webster Properties.*—Statement covering the 30 corporations under their management; 5 by 7¼ inches; 81 pages. Complete statement covering each plant, with map of territory served.

*Manual of Engineering and Surveying Instrument.*—Messrs. W. and L. E. Gurley have recently published the 45th edition of their manual; 4½ by 6½ inches; 516 pages; price 50 cents. It is handsomely illustrated and contains much matter in a concise and readable form. An appendix covering the goods manufactured by this pioneer establishment does not detract from the value of the manual.

## The Amber Light Campaign in Chicago, Ills.

[Prepared for the JOURNAL, by MR. T. R. BEEBE.]

*Our Aim.*—The Amber light serves *admirably* as an opening wedge for the introduction of cabinet ranges, water heaters, fireplace appliances, etc. In nearly all Chicago homes gas is used to some extent, and we have demonstrated that its use can be greatly extended, to the benefit of the customer and ourselves, by means of a systematic canvass by trained men.

*Organization.*—Our city is divided into 15 districts, with a showroom and office for the accommodation of the customers in each district, where they may transact all ordinary business with the Company. It is from these showrooms that our Inspector-Salesmen operate.

These Inspector-Salesmen, during the fall and winter, are each assigned to a separate street until each house on that street has been thoroughly canvassed for Amber lights. They wear the gas inspectors' cap and Company badge. Each man is first carefully drilled by an experienced supervisor; the two men work together for at least 1 day before the new man is permitted to go out alone.

*Method of Introducing Lights.*—The Inspector-Salesmen go prepared to install complete lights, and to also repair mantle lights. They experience no difficulty in securing the customer's attention when they display the well-known Gas Company cap and badge, worn also by the meter readers.

They ask the customer if they may be of service regarding her lighting burners. They install complete lights (always with pilot attachment) for demonstration, and secure the customer's signature to a charge ticket purchasing the lamp and authorizing us to bill the amount ($1.60) in two payments with the following gas bills. Each street is canvassed several times every season, and with good results.

The men are paid 30 cents commission for each complete lamp, 20 per cent. for repair parts sold, 10 per cent. for all fuel appliances, and $1 for each arc lamp sold or leased. Prospect cards may be filed with branch managers, and the inspector-salesman is paid full commission when sales of fuel appliances, fixtures, etc., are made in the show rooms as a result of calls made and indicated by his prospect cards.

The inspector-salesman must keep the prospect alive by return calls at reasonable intervals, and his card is looked up and credit given after he has reported the appliances installed. In the spring and summer time he uses these installations as a pivot to swing orders from the neighbors. The commission men make at least one complete, systematic canvass of factories and stores for arc lamps each year, to supplement the work of the regular salaried solicitors.

Canvassers' prospects for industrial fuel appliances are followed up by special experts, and the canvasser is entitled to 10 per cent. commission on the sale for finding the prospect. Many types of artistic and permanent installations of gas heating devices can be made to supplement the coal fires, and these orders are earnestly sought after, especially in the spring, summer and early fall. The number of cabinet gas ranges being installed by us is now about one-half of our total store sales. Outside dealers report great increase in the sale of mantle burners and repairs and they are now selling the best. Gas fixtures are displayed only with complete equipment of mantle lights, upright or inverted, with pilots and suitable glassware.

We sell mantle-burner repair parts at the regular dealer's price, and we deliver and install them without extra charge, cleaning and adjusting the burners, thus insuring continued good results. Some of this work is done by commission men, some by salaried burner repair men. All are watchful to secure orders for additional lights.

The type of mantle light which we have introduced so extensively, that the biggest factories have had difficulty in turning out the burners fast enough, is only one type of many high-class burners. For that matter gas lighting is only one of our "fields," none of which should be neglected. The fall and winter being the ideal season to develop this particular field, we make the most of it at that time, never forgetting to be watchful of the customer's needs in other gas directions.

We also operate a systematic maintenance service for single mantle lights (exclusive of our arc lamp maintenance) by which we contract to care for the lights monthly at a graduated rate as low as 10 per cent. for each light, for 5 or more in one premises.

Newspapers and circulars have been used freely and the text following has been used in connection with the illustration:

*The Lamp Light Hours Between Dusk and Bedtime* are the hours that make home life what it is. Under lamp light the members of the family meet and mingle their ideas.

So lamp light itself must have a big influence on the thoughts and words of Lamp Light Hours.

Bad light will work for discomfort and irritability.

Good light will work for contentment and cheerfulness.

You can't afford to have your little family work, sew, read, study, plan and play under a poor light.

Certainly not in Chicago, where you can get a genuine Amber Light for $1.60.

One Amber Light will flood your living room with light of genuine amber color.

The softest, most luminous and most generally harmonious of all colors. So pleasing a color and so completely satisfactory for home illumination that our orders for Amber Lights now exceed 500 a day.

The price—$1.60—not only covers globe, chimney, burner, chain pull ignition, etc., but also the work of putting the light up as well.

There is no reason on earth why you should not enjoy an Amber Light in your living room to-morrow. If you like you can remit the cost in two payments—next month and the month after.

But don't ask your family to go without one of these truly wonderful lights any longer. Drop us a postal to-day and we will send the man with the light to-morrow.

Just address The Peoples Gas Light and Coke Company, Peoples Gas Building, Michigan Boulevard.

[ABSTRACT REPORT.—CONTINUED FROM PAGE 456.]

## SIXTH ANNUAL MEETING, NATIONAL COMMERCIAL GAS ASSOCIATION.

HELD AT MECHANICS' HALL, BOSTON, MASS., DEC. 6TH TO 9TH, 1910

### THIRD DAY, MORNING SESSION.

When the reading of the Wainwright paper proper was ended, numerous lantern slides (the work of Mr. H. H. McPherson), showing installations of fuel gas appliances, were shown. Many of these were so graphically shown that applause followed the picturings. Briefly noticed the plates presented: A toaster, pipe burner, standard ring burners and a small cyclone burner. The standardizing of these burners had been carried to the point that each ring burner contained all the parts of the next smallest size, and that standard pipe and fittings were used wherever possible. The toaster was an adaptation of ordinary oven pipe burners, inserted in a special frame of the toaster. A porcelain-lined kettle for cooking face cream is exemplified as one of the uses which could be made of a 3-ring. In fact, the uses to which that type of burner could be put are almost numberless. Anywhere that heat was needed under anything, the burners, alone or combined, would do the work.

The next photograph showed one of these burners fitted with a refractory top for use in inclosed fireboxes, such are found in coal fired steam tables, bake ovens, etc. An inclosed motor and fan blower, water still, blast soldering iron and varying sizes of blast burners, were next shown. Then came a large iron used for soldering very heavy work. Following were shown examples of appliances sure to bring large amounts of industrial fuel consumption. For instance, 2 brazing burners and a brazing table, by means of which brazing, forging, hardening, tempering and annealing could be done with these burners, aided by a furnace built up of loose firebrick, shown on the table. This photo. also showed a melting furnace and an oven

furnace and a positive pressure blower. Next a large blast burner shown as being used in Chicago for lighting cupolas in foundries, which use was in every city. Next, a blast burner in use, shaping a heavy firedoor ring on a locomotive boiler. It could be shaped nearly to fit the door opening, but the job had to be finished when being installed on the work and the burner was used to heat it up so it could be shaped more easily. The two succeeding pictures showed how a blast burner was used in straightening a beam bent in a boiler explosion. The beam had been heated by a blast burner and straightened in place with clamps. No. IV. showed the use of a large burner for drying vats in breweries, and the large, soft flame, shown in No. V., portrayed the operation of skin drying moulds in foundries.

The candy burners, shown in No. VI., were being used in a Milwaukee candy store and served as examples of the wide variety of industrial uses of an ordinary, single burner hot plate. No. VII. showed a new device called the auxiliary furnace heater, for heating the ever-present cold room that the furnace will not heat, and which was particularly desirable in fall and spring for the living room. No. VIII. showed an installation of two bake ovens at work, in Syracuse, N. Y., and afforded an example of the field for home cooking business in hotels and restaurants previously supplied by large bakeries furnishing supplies baked in coal-fired brick ovens, No. IX. reproduced an installation of 5 bake ovens installed in a residence section, home-cooking establishment, doing a very great variety of work. No. X. was an example of a storage water heater, designed to give similar service to that given by an instantaneous water heater, on a very much less consumption of gas. Besides the thermostat, placed just above the heater and to the rear of the flue, its most distinguishing characteristic was the arrangement of hot and cold water pipes close to each other and fitting into the tank below. That made the decreased temperature difference between the hot and cold water pipes so much that there was no back circulation, with the heater used virtually as a refrigerator, when the heat itself was shut off. That made it possible to have the heater stand all night without once operating the thermostat, due to the slow cooling of the water in the tank. No. XI. showed various adaptations of gas-fired steam boilers. One showed the moulding of gloves, as carried on in Milwaukee. The small boiler shown in foreground supplied steam to the moulds, and the water condensed in that previous operation flowed back to the boiler, thus saving the contained heat. No. XII. illustrated an 8-horse power boiler, generating steam at 50 pounds pressure, for vulcanizing treads on automobile tires. The fuel cost per tire was but 35 cents.

No. XIII. was another example of a similar installation, in Chicago, for vulcanizing the threads on automobile tires, equipped though with a flash boiler instead of a water boiler. The boiler held no water save when there was demand on it for steam, when the thermostat that turned on the gas also turns on the water, which, coming into the hot pipes, immediately burst into steam. No. XIV. was a high pressure boiler used for supplying steam to jacket kettles. The return trap on the top, right of the picture, was for returning the water of condensation to the boiler. No. XV. was an automatically controlled boiler, used for similar purpose. The steam gauge stood at 100 pounds, and this automatic control on the gas supply turning the gas on or off accordingly as the steam pressure varied from 100 pounds. The low pressure steam generator was made up of two Walker water heaters connected to a steam drum supplied with a gauge, and was used for supplying low pressure steam. Its main characteristic was low first cost for installation. No. XVI. showed an individual boiler supplying steam to large jacket kettle. The boiler at left was used for supplying the small burner shown and used for ironing shoulders and necks of ladies' garments. No. XVII. displayed an installation for supplying superheated steam to the calendar rolls of a machine used for making paper oyster pails. He said that, in addition to the uses shown, ordinary gas fired steam boilers were used for many other purposes, such as steaming cloth, boiling syrups, distilling alcohol, steaming bake ovens, sterilizing work in hospitals and creameries, and in cleaning and dyeing establishments.

Photograph XVIII. showed a summer arrangement for heating water in large hotels or apartment houses. In XIX. was depicted an arrangement for heating a theater in San Antonio, Tex. The gas entered through a valve, primary air comes in through a blower, and secondary air was taken around a bell-mouthpiece of the motor-driven blower, shooting the heated air into the theater. Figure XX. stood for the California tire heater. Air and gas were forced under pressure into a central distributing box, which was connected to the burners by rubber tubes. It consumed about 800 feet per hour, and was a very great advance in setting tires in repair shops or shops where wagon wheels were made. In picture XXI. a tire heater and remover were installed in a repair shop. Sixteen tires of various sizes could be heated at once, with a consum ption equal to that required in the previous picture. At a cost of 6 cents the 16 tires could be heated. The device on the left was used for removing tires that had been badly cupped over the edge of the rim, so that they could not be removed without heating. Around the edge of the tire the gas flames played down upon the tire, also dim ly on the sides, the gas flames playing into the oven. It was really an oven, the picture being taken with the doors open. When a tire was to be heated the doors were closed.

Coffee roasting (as per the picture) was a field that seemed almost made to order for gas. The absolute control and evenness of heat obtained with gas got the business in almost every case. The installation shown would roast coffee at gas cost of 6 cents per 100 pounds. The following example showed an installation of coffee roasters at work in Milwaukee, quite like the Chicago example. The rotary roaster next shown was for roasting cocoa beans, and similar ones could be used for roasting all sorts of nuts. Series XXII. displayed a gas-fired locomotive tire setter, which consumed about 1,200 feet of gas per hour and would heat a tire in say 15 minutes. One could see very plainly the way the setter was built and how the flame played against the locomotive tire; also the approximate size of the tire, which was very large and thick, requirin g a high degree of heat to bring it to temperature in certain length of time. In XXIII. was shown an oven for japanning complete sets of bed springs. It held at each baking 10 sets. Picture XXIV. outlined a device used by the Detroit Gas Company for controlling the mixture of gas and air supplied to the burners of japanning ovens, hat blocking, machines, etc. As they could notice, the governor was set upon the air supply, the gas flowing toward the right. The gas valve, automatic air valve and a gas cock are in line. When the pipe was wide open, supplying the burners without the oven in operation, one got from time to time a mixture of 6 to 1 of gas and air; then this valve *A* was left as it was. Suppose few or many machines were connected to the pipe line on the supply line. In case it was less, the valve would be slightly cut off, and the pressure through the pipe to the top of the governor would lessen the pressure thereon, causing the governor to adjust itself to a position of equilibrium with the pressure in the air main. Conversely, if one opened it wider, the pressure was increased on top of the governor, thus automatically governing the air mixture in same proportion. Photo. XXV. outlined a small glass kiln for burning colors into the stained glass for working into art glass work. Another section showed a larger one, used for firing large stained glass windows for churches. The pipe bending forge (XXVI.) was an excellent appliance, that could be installed in many places for use in bending all kinds and sizes of pipe. The right bender was shown closed, for it was used when the device was in operation; the one to the left was shown open, so they could see the shape of the frame and the way the pipe goes in. The small burner at the bottom of the picture, with hose attached, was simply a ring burner used for heating the hardening ring of crushing rolls before shrinking on the center spider, shown above. This 6-ton metal pot (XXVII.) was used for melting newspaper type metal. Another shape was that of a large metal pot, used for melting stereotype metal.

These hotel series of photographs (XXVIII.) had been very kindly sent him by Mr. Graves, of Atlantic City. It was expected at that time that his paper would be given on the same morning these pictures would be shown. I would be glad if he would speak upon the several photographs.

Mr. Graves said he did not believe he could say anthing in addition to that which he said yesterday on points brought out covering the hotel ranges. He might say that a particular photograph portrayed the Armour, one of the beach front hotels in Atlantic City, and it pictured a 3-section range, having one broiler with roasting oven above. It was complete all-gas fixture in addition, with coffee urns, toasters and necessary appliances, set up in a former all-coal kitchen. Another one is in a beach front hotel, having installation made previous to the first one. Both hotels were owned by Mr. De Zella, and it was through the installation last shown that he completed his larger kitchen in "The Armour." There were shown in rapid succession the gas kitchens of the Kentucky, the Chelsea and the Rudolph.

Continuing, Mr. McPherson noted that picture XXIX. illustrated the use of gas for making ice cream cones and brought in a fine long-hour revenue during the summer months. About every city had at

least one factory of the kind, since ice cream cones were too fragile to be shipped far without excessive breakage. Figure XXX. showed an installation of 4 blast furnaces in a wholesale candy factory. The cleanliness, convenience and economy of gas caused the candy makers to prefer it to almost any other form of fuel. The cost per 100 pounds for cooking hard candy with this installation was approximately 7 cents. Next (XXXI.) was a rotary kiln used for drying tobacco. It held 600 pounds of tobacco and used 700 cubic feet of gas per hour, and carried 12 blast burners. With that equipment it cost about 92 cents per 1,000 pounds to dry the tobacco, depending, of course, upon the percentage of moisture the tobacco contained. No. XXXI. was a picture taken directly in the mouth of a rivet heater. With it one could have the rivets in plain sight, just a few inches away from the fingers, at a white heat, without the slightest danger to the riveter. One man with one gas rivet heater could heat 2,400 rivets per day of 8 hours. Using coke forges, 8 men would be required to heat an equal number of rivets in a day; whence it could be seen that a consumption of 175 feet per hour was negligible compared with the wages of 4 men. No. XXXII. showed a kiln for depositing silver on glass in mirror factory, and No. XXXIII. portrayed a steam presser supplied with steam by means of a small gas boiler with an under burner. The garment was placed over the machine, and the operator, placeing his foot upon a treadle, forced a small amount of steam through the garment. All the flat places on the garment could be pressed instantaneously after the garment was placed upon the machine. The finish work was done by hand. No. XXXIV. exhibited a non oxidizing metal melter, drying oven and pickling jars used in galvanizing metal parts. The next series (XXXV.) showed applications of gas in laundry work. First was a gas fired mangle, next a gas fired shirt machine, and to the right was the iron used for finishing work on the shirts, heated by gas. The last showed a smoothing table for laundry work for smoothing edges of collars and shirt bands, etc., all of the machines being heated by gas. Fig. XXXVI. was a matrix dryer used for drying the printer's matrix, and XXXVII. represented a rotary annealing furnace used by a watch case material manufacturer for annealing metal stampings and drawings. Then in rapid succession were shown a rotary furnace used for annealing sheet metal goods; furnaces for annealing, boiling out oven, and those used in a silverware manufacturing establishment; a battery of annealing furnaces used by the optical company, of Rochester, N. Y., for annealing all kinds of lenses. The absolute control and even distribution of the heat in this kind of work made gas an ideal fuel. A large annealing furnace fitted with endless chain and used in the same factory for annealing glass. The endless chain made 1 revolution every 3 hours. A furnace for annealing spun brass, in which a thin sheet of that metal is shaped around a wooden form on a lathe in making little jardinieres. In order to take the strains out of them produced by this forced method of treatment they are heated to a certain temperature in a special furnace. The annealing furnace shown is a Chicago product, and next was a box-board lining machine in use in Rochester, N. Y., for making the linings of boxes by a large wholesale grocery establishment. The oven and cyanide hardening furnaces shown were installed in the Franklin Motor Car Works, and were used for hardening automobile parts, and the cyanide furnaces displayed were used for hardening typewriter parts. Another furnace shown was used for hardening engraved rolls, Next in order comes a very complete installation in Chicago for the hardening of all kinds of steels, including high speed steels; a battery of soft metal furnaces heated by gas; a gas-heated, soft metal pot used in Chicago in a silverware factory, where they cast the metal parts of knives and forks; the Stewart melting furnace, in use in Syracuse, N. Y. It had a very clever arrangement on the top for raising and swinging aside the cover, leaving a full opening at the top to remove the article. Next, a galvanizing tank and melting pot installed in a Chicago factory, used for galvanizing metal parts—the example shown represented a 2,000 pound pot for melting zinc; an installation for blocking hats. That was an installation where it was necessary to prevent the formation of any carbon or soot upon the machine, due to imperfect combustion of the gas, and this was where an excellent application existed for a governor, similar to the one shown, and used in the japanning oven at Detroit, to control the mixture of gas and air. The proportional meters used in this particular installation to control the regulation of the proportion of gas to air could be seen. They could see the governor on the gas supply on the right, and in front of the right hand meter was a small fan blower, which blows the air into the meter. On the left the two metals were toggled together, so they revolved at a certain predetermined ratio of speed to each other, thereby keeping the mixture of gas and air supplied to the machines constant. The large oven furnace next shown was used for annealing the transformer laminations seen upon the truck, which was ready to be shoved into the furnace.

The next picture showed the use of gas for testing purposes in a mantle factory. They could see something similar in the Welsbach show on the exhibition floor. Following that came an installation respecting a gold refiner's assay furnace. Last was the reproduction of a large annealing, hardening and tempering furnace, fitted with double-blast burners to insure even distribution of heat. The bed of that furnace was 30 inches wide and 8 inches high. The door opening being 30 inches wide and 8 inches high. Many other photographs could be shown of other uses for gas, and it had not been attempted in the presentation to weary them with presenting any larger number of uses than those shown. He believed there was a very fruitful field for education in showing such pictures as these around among the various plants in the country. During the process of preparing the photographs he was much encouraged and surprised to note the enormous number of uses that had been found for gas outside of those with which he had been familiar. He believed all would be impressed, too, with the large number of uses to which gas might be applied, although all these were merely a scratching of the surface.

*Discussion.*

The President said it seemed to him they had an object lesson of the infinite possibilities of the use of gas in the industrial field. The exhibits represented the collection of installations from a number of different gas companies. There is no reason in the world why any single gas company, in addition to those that they themselves had at the present time, should not have installations similar to all of the others, so all could easily see the tremendous possibilities before them. He thought they were indebted to the authors and editors of this paper, especially to Mr. McPherson, for the time spent upon it. He regretted they would have to restrict the discussion somewhat, because two other important papers would follow. However, they would be very glad to hear from anyone desiring to speak on the subject.

Mr. Eves thought it would be interesting and helpful, especially to some of the smaller companies, to know that they made an attempt some little time ago to find out all the installations and all the industrial appliances that could be used. The excellent lists published in Boston and other cities were taken as the basis of the inquiry, and lists were submitted to the majority of the gas companies of the country, in order to find out additional appliances. That comprehensive list had been sub-divided and classified in three lists under the head of the different industries which could use the various appliances. They, however, excluded the appliances they were not able to use in Indianapolis, such as the tobacco drier and other things that were not applicable to their city. He thought it might be helpful if they offered to send on request by mail those three lists. They would be very happy to do so. [Applause.]

Mr. Scherck supposed the photographs would be printed in the proceedings. They might go a step further and have the photographs gotten up in large shape, the members being allowed to subscribe for them in that shape at cost. If that suggestion was adopted, they might add certain information as to where these things were used, the city and the place. He asked the Chair whether it would be better to put that in the form of a motion?

The President said they could provide for reproductions and have the sets in the office of the Association, subject to call of any member at a certain price. He presumed undoubtedly that the slides would be reproduced in the paper, but would not be as satisfactory as photographs would be. They could, though, without a formal motion, provide for that by announcement later on in the "Bulletin."

Mr. McKee said there was a correspondence school where a person who wanted to become proficient in gas engineering could take a course. He thought that school had done much good for the gas engineers from the operators' standpoint, and he thought a similar plan could be operated in connection with industrial gas. He had looked at the photographs with great interest. Some of them were 7 or 8 years old; some of them were new. A committee to pass on the progress that had been made, to see that every idea presented at the meeting was a new one, to be able to say that a certain man who has passed an examination set by them was a competent industrial gas engineer, would be a good thing for the commercial department. Talking to the Manager of the Mobile Gas Company the latter said, "This industrial business is not an awful good. Somebody comes

along and gets me all worked up. I hire a man and spend $300 or $400 and get discouraged. I put it aside and decide to cut it out; then someone gets me worked up again and I go on the same old proposition." He could not see very well how that could be avoided, unless some such institution as a correspondence school or an industrial course or industrial handbook was worked up by the Association as a recognized method of doing certain operations.

Mr. Offut called attention to the possibilities of industrial work, also to some of the limitations respecting it. He thought it desirable to forestall, as far as possible, the installation of crude oil for industrial work, but where it had been installed, and the manufacturing companies had spent considerable money in a fuel oil appliance, it was very hard to oust the competitor. In some recent work in the industrial field they found their best customer had bought some $12,000 or $15,000 worth of appliances for crude oil, and they had considerable trouble at first in even getting a trial. They found, especially in copper work, that they could offer something besides the cost; in fact, they could not compete with crude oil in cost, but as to nicety of adjustment and regulation of heat temperature, they were able to show something particularly attractive. They got several very large installations, one of which used something like 18,000 to 20,000 feet a day. They were also able to copper weld and make switches in Schenectady. It was found where oil was used the surfaces were not so good, and as to copper welding they got that fixed. Last year they increased their consumption with one concern about 20,000,000 feet. They had also recently been able to forestall the use of oil in an outlying plant, to which they had to lay ½ or ¾ mile of main to get this business. They had recently purchased and installed quite a large order of industrial appliances. They have been adding to those, and probably there would be growth. They felt they had done something toward forestalling the use of oil in that plant.

The President said he regretted to order the discussion closed. However, members having discussion on that or any other paper could send it written to the Secretary and it would be printed in the "Proceedings." Such prepared discussions, however, must be in hand a few days after the closing of this convention. He then introduced Mr. H. L. Doherty, of New York, who read the following paper on

## RATES.

This organization is interested primarily in the sale of gas and the methods of selling gas. The cost of gas to the consumer is one of the items which has a great bearing on this problem. It has been demonstrated in the electrical business that the cost to the consumer is greatly influenced by the method of charging.

It has probably never occurred to the majority of men actually engaged in selling gas that there is any different or better method of selling gas than "at so much per 1,000 cubic feet," without regard to any factor other than the quantity of gas used. The sale of gas at a uniform price per 1,000 cubic feet was for a number of years almost universal. The electrical business never did have a method so universally used. Some companies fixed their charges by the number of lamps installed, while others fixed their charges by the amount of current used. In spite of no such complete conventionality in the electrical business it has required many years of work and discussion to even arouse general interest in the science of rate making. In view of almost complete conventionality in the gas business and less previous work and discussion it would seem a still more difficult matter to work out any reform of rates in the gas business, were it not for the fact that the problem is now better understood and there is available not only the literature, but also the experience of the electric companies.

Perhaps no other one factor has contributed so much to the success of the electrical business as the study of the rate problem. Complete reform has not yet been realized; in fact, even the electrical business has only reached the point of what might be termed acute interest. However, discussion of the rate problem has generally resolved itself into one of scientific cost analysis, and the various discussions of the rate problem have given the electrical men a much keener knowledge of their costs and a much better idea of what constitutes profitable and unprofitable business, and has worked a radical change for the better in their commercial methods.

To a very large extent this improvement in the electrical business has been to the detriment of the gas business, and that fact alone should have brought the rate problem forcibly to the attention of the gas companies.

The old school of electrical men held back rate reforms, through lack of knowledge of real costs, by inattention, or by opposition—often expressed in the form of ridicule. In every class of business, however, new men are constantly coming to the front, and the new recruit has fewer prejudices than the man who has reached the point where he believes he has nothing more to learn. The electrical business possessed many keen and unprejudiced men even amongst its old-timers—perhaps more than any other line of business. Through the tolerance of these men and the work of the new recruits consideration has been accorded this important problem, with the result that many electrical men can readily distinguish between profitable and unprofitable business, have broken away from conventional and erroneous ideas which originally prevailed, and, in most instances, are not only able to distinguish between profitable and unprofitable business, but are able to determine the degree of profitableness of each class of business that can be secured. This does not mean that the electrical man has no work to do on this problem, or that the science has become perfected and needs only to be propagated. The science is still undoubtedly far from perfect and propagation has probably not as yet covered more than 10 per cent. of the men engaged in the business. It is, however, probable that the matter of rates and costs has now assumed an importance in the electrical business which will insure not only the development of the science, but the general propagation of the teachings of this science.

In the early days of the telephone it was customary to charge so much per instrument, regardless of the number of calls that were made per year. To a great extent this method has been abandoned—and I refer to the telephone simply because this branch of service offers an excellent example of the cost of service to the company, the value of service to the consumer, and how inequitable charges will curtail the volume of business done and cause the community to pay more for service as a whole than would be the case if a rational system of charging was used.

Sometimes examples exaggerated beyond the normal conditions offer excellent means for explanation. Let us assume that in a certain city telephone service is furnished at $40 per instrument per year, and two men have adjoining offices in the same building. One uses his telephone only for emergency use, while the other uses his telephone at about a normal rate. A uses his telephone, we will say, once a year, while B averages 2,000 calls a year. This means that A is paying $40 per call for his service (if figured on a call basis), while B is paying but 2 cents per call. It is very apparent that it costs the telephone company more to take care of B's needs than to take care of A's needs, and from the standpoint of equity they should charge B more and A less.

I am unfamiliar with telephone practice, but I would not be surprised if some instruments are used as much as 30,000 calls per year, while some are used as little as 100 calls per year. This would be a ratio as 1 is to 300. In my example I have taken a ratio as 1 is to 2,000.

From the example I have taken, it would seem apparent that if any consumer, like A, can pay $40, then a consumer, such as B, could afford to pay more than $40, and, therefore, the company is not receiving all that B would be willing to pay—disregarding the matter of equity. It is also apparent that if the company can afford to supply B at a rate of $40, then it can afford to supply A at less than $40; and if consumers of the class of A were given an opportunity to have telephone service at less than $40, presumably more of them would have telephone service, and the company would do a larger volume of business. So, by basing its charges on "so much per instrument," it is apparent that the company is charging some consumers more than the service is worth and other consumers less than the service is worth, is not getting all from some consumers that these consumers would be willing to pay, and is also asking a price which is too high and beyond its needs to cover the cost from certain classes who might become consumers.

A system of charging which permits any business to be carried at less than the cost to the company and prevents the acquisition of business which might be had on a profitable basis, means that the community pays more on a whole for service than would be required under a rational system of charging.

The modern tendency, I believe, in telephone service is more towards basing the service on the number of calls made—which conforms almost exactly with our method of selling gas at so much per 1,000 cubic feet. Now, keeping the first example in mind, we will assume that the telephone company concludes to change its method of charging from an instrument basis to a call basis, and it finds that it will be necessary to have about 4 cents per call to get the same revenue. The company has now established a condition where A, instead of paying $40 per year, pays 4 cents per year; and has in turn

raised the cost of service to B from $40 to $80. It is now apparent that A is paying too little and B is paying too much, and the inequity in each case is due to the fact that the company has based its charge simply on one branch of the service instead of upon all branches of the service that contribute to the cost.

If we carry the example further, and assume that the charges are changed from an instrument basis to a call basis, we will probably find that a class of consumers, such as B, will limit their calls as much as possible, and every call they save saves the consumer 4 cents, but does not save the telephone company more than 1 cent.

This is one example of how inequity of charging tends to discourage development of business, or tends to curtail business; and from this it can be shown how an equitable system of charging tends to develop business and tends to give the community the maximum service for the least cost, assuming in all instances that the telephone company receives a fair and the same return under each system of charging over and above their operating expenses as a return on the capital invested.

There are probably many factors that contribute to cost of telephone service, but considering only two, namely, the furnishing of the instrument and its conductors as one element and giving service at the central office as the other element, the equitable method of charging would be to have an instrument charge of, say, $20 per year plus a charge of 2 cents per call. Under this method of charging, and at these specific figures, A would pay $20.02, while B would pay $60. In each case the telephone company would receive for these two instruments and their service approximately $80 per year. As B not only requires the instrument, but also requires 2,000 calls per year, he probably would be perfectly willing to pay $60; while an enormous amount of business on this more rational method of charging could be secured from the class represented by A, who would not feel able to pay $40 per year.

Scientific charging methods are applicable to almost every business, and it is a common error to justify inequities in one business by pointing out similar errors in other lines of business. The development of the science of charging and its universal application would do more, I believe, to reduce the cost of service to the public than if it were possible for them to confiscate half of the profits from all of the business enterprises. The public frequently look for reduction in the cost of service from the wrong standpoint, just as business men often look for the creation of business from the wrong source.

In the beginning of this paper, I called attention to the cost of gas as one of the elements in selling gas, and many people, no doubt, will believe that this is the prime element. Many examples could be given to show that the price charged for the gas is not the controlling factor. Aggressive commercial methods will undoubtedly do more for the development of sales than simply a reduction in price. Not only this, but with the price of gas at, say, $1 per 1,000 cubic feet, the cost of service to the consumer can be reduced by highly efficient appliances and good service more than would result from cutting the price of gas to 75 cents per 1,000. I do not want to confuse you with terms or unnecessary distinctions, but, as a rule, the company sells gas, while the consumer in reality is trying to buy light, heat or power, and the efficiency of the appliances used to produce this light, heat and power are greater factors in the reduction of cost, and, therefore, the rate charged by the company is not synonymous for the cost to the consumer.

The cost to the company of supplying the consumer with gas depends not only upon the amount the consumer uses, but the rate at which he uses it. The term "load factor" is a very useful one, and is applicable to almost every business, although used now almost exclusively to apply to the electrical business. This much-abused term always carries with it a more or less comprehensive meaning, and when the standardization committee of the American Institute of Electrical Engineers have completed their work we will be able to use this term with greater accuracy.

When we speak of the load factor of the load on an electrical station, we refer to the relation between the maximum demand and the average rate of generation. If the maximum demand on an electric station is 10,000 kilowatts and the average rate of use is 2,000 kilowatts, that would mean a load factor of 20 per cent.; while if the electric station ran the entire 8,760 hours of the year at the maximum load of 10,000 kilowatts we would then have a 100 per cent. load factor.

We are apt to speak of load factor on the station as applying to the entire system; but such is not the case. The use of the term "load factor" in gas practice, if generally understood, would assist very much in explaining our various problems. Applying this term to the gas business, and explaining its relation to the various parts of our system, we can start with the consumer's meter.

We think that it is necessary to install a 5-light meter for the ordinary consumer on the assumption that the maximum demand of this consumer will be, we will say, as much as 100 feet per hour. The old type 5 light meter had a capacity of approximately 100 feet per hour, and in all probability gas is used by the ordinary consumer at this rate at certain times in the year. If gas were used at the rate of 100 feet per hour for every hour in the year, it would correspond to a consumption of nearly 1,000,000 feet of gas per year, and yet the average of our consumers use but about 30,000 feet per year; so our meters work at a load factor of approximately 3 per cent. That is, 3 per cent. of the gas passes through them that they are capable of passing.

We install a service having a capacity of about 3,000,000 feet per year, and with a use of 30,000 feet to the service our service is working at a load factor of about 1 per cent. In other words, 1 per cent. of the gas is used that the service is capable of carrying; or, stated in another way, we are compelled to install a service large enough to carry 100 times as much gas as the average use.

Our distributing mains, as distinguished from our feeder and transmission mains, work at a better load factor, due to the non-coincidence of the peak of our various consumers, and by this I mean that all consumers will not use gas at the maximum rate at the same time. And generally speaking, our distributing mains work at a load factor of about 10 per cent.; that is, we install these distributing mains so they will carry 10 times as much gas as the average use, so we will be able to supply the sum of the demands of our consumers at any one time without a serious diminution in pressure,

As we go back from our distributing system to our works we get a further tendency towards the equalization of the non-coincidence of the peaks of all of our consumers; that is, more consumers are fed from a common source and more nearly will we approach a rate of demand which corresponds to our average consumption rather than the demand which would correspond to the sum of all of the greatest demands of all of our consumers.

Our distributing mains are fed from our feeder mains, which have approximately 7½ times the conductivity which would be required if our gas was used at a uniform rate. In other words, our feeder mains approximate a load factor of 14 per cent.; while our transmission mains have to be of a size capable of carrying about 5 times the average consumption, because the rate of demand will be 5 times the average rate of consumption; and our transmission mains, therefore, have a load factor of about 20 per cent. Roughly speaking, the output of the ordinary gas works is about 200 times the maximum day's demand; so the load factor of the gas works is a little less than 60 per cent.

This somewhat long explanation and example of load factor will give you an idea of what our investment must be and our operating expenses as against what they would be if gas were used at a maximum and a uniform rate. For instance, we would have only one meter to buy and take care of where we now have approximately 33; we would have only one service to put in and take care of where we now have 100; our distributing mains could have one-tenth their present conductivity; our feeder mains one-seventh; our transmission mains one-fifth, and our manufacturing plant would only have to be about half as large as it is now.

Some of our consumers approach the ideal conditions we would have with a load factor of 100 per cent., while others require an enormous investment in relation to the gas they use, which makes a charge of $1 per 1,000 entirely inadequate. We have an example here similar in a way to the example of telephone service. We are serving some consumers at less than they should pay, while our method of charging causes others to pay more than they should and keeps a large number of profitable consumers off of our books.

It is generally conceded now by the electrical men and the advanced thinkers in economics that the three important elements of cost in the supply of electric service are as follows: (1) The consumer expense; (2) the demand expense, and (3) the energy expense. These are all affected by the distance service must be given from the generating plant, but for reasons which I will not take up at this time this factor is generally disregarded.

You can readily see how each consumer, regardless of the amount of his demand or the amount of his consumption, causes a certain expense to the company, and you can also see how the rate of demand of a consumer, independent of the consumer expense and independent of the amount of gas consumed, causes a certain expense to the com-

pany. You can also see how the supply of gas, which we now consider the only element of cost, is still an element of cost independent of the consumer expense or the demand expense. For this reason, as far as the science has been developed, the ideal charge would be a consumer charge of a uniform amount for all consumers, plus a de mand charge of a uniform amount per unit of demand, plus a charge for gas of a uniform amount per unit of gas.

Such a system of charging would tend to compel every consumer to pay all the cost he occasioned. In other words, it would save the company from doing business at a loss with any consumer. If not compelled to do business at a loss with any consumer, it would tend to make it possible for the company to supply their profitable consumers at a lower rate; in fact, this system of charging would bring the cost of service to the profitable consumers at a lower rate and would enable the company to encourage more of the profitable business. Unless some new development is brought forward in this field of economics this will probably be the rate method towards which we will all eventually work.

While this method of charging has been before the electrical fraternity nearly 10 years it has not been adopted to any great extent, although to-day it is largely the basis on which all rates are fixed or upon which their equity is measured. The question of rate making has been before the electrical fraternity in more or less scientific form for more than 20 years. Perhaps the best paper that has ever been written on the rate problem was published by Dr. John Hopkinson, of Manchester, England, as far back as 1892; and, unless I am mistaken, Dr. Hopkinson used his method of charging as early as 1888. Hopkinson's theories of rate making were, however, so far in advance of his time that his writings were practically lost sight of until 1902.

Some time prior to 1907 the Wright Demand System was invented and inaugurated by Mr. Arthur Wright, at Brighton, England. It is the general belief that Wright got his ideas from Dr. Hopkinson and invented the Wright Demand Meter, and in this way gave the Hopkinsom method a practical application. I am told, however, that Wright got his ideas, not from Hopkinson, but from a man by the name of Green, an American, and also from our Thos. A. Edison.

Both the Hopkinson and Wright methods took into account only two of the three factors which are now universally conceded, namely, the rate of demand and the energy; or, if we were referring to gas, it would be the rate of demand and the amount of gas.

In 1896, with some knowledge of Wright's system, but without recognizing many of its important features, I evolved a complicated system or rates covering many factors, including the three given above. All of the factors were gradually eliminated until I had but the three, namely, the consumer charge, the capacity charge and the demand charge. In 1900 I presented a paper before the National Electric Light Association, explaining this method of charging, which at that time seemed to meet with universal disapproval. I had already made limited applications of this method of charging and was rather pleased with its results. My paper before the National Electric Light Association was largely for the purpose of inviting criticism. From the time my paper was written, until about 1906, there was no encouragement given to me to follow up this work, and since then I have been far too busy to do it.

To the system which I evolved I gave the name of "Readiness-to-Serve," and it was known for a long time as the Readiness-to-Serve method of selling. This term, however, has become almost meaningless, as it is now applied both to the Hopkinson system and to what I will term, immodestly, the Doherty system, for the lack of any other name, and to other modifications of these two systems.

My work on the rate problem was entirely independent and without any knowledge of the work done by Dr. Hopkinson; in fact, I never read Dr. Hopkinson's paper until about three years ago, and I then asked the *Electrical World* to republish it, because I am still convinced that Dr. Hopkinson was the pioneer of this science, and it has always seemed to me that his explanation was the best that has ever been given. If Dr. Hopkinson had dealt with the conditions as we now have them, I am confident he would have included the consumer charge.

The consumer charge is a negligible factor when current or gas is being supplied only in large quantities, but under modern conditions it has become a factor of more importance than the demand charge. Examples are lacking for an illustration of this statement in the application of this method of charging to gas, but in the electrical business, as we have further and still further developed our business, the simultaneous maximum demand per consumer has greatly diminished. The well-developed central stations of to-day seldom have a simultaneous maximum demand of more than four-tenths of a kilowatt per consumer, and in some instances below that three-tenths of a kilowatt per consumer. This refers to the lighting service only, and not to the power. We can approximate the fixed charges of a central station at about $60 per kilowatt, if all fixed charges are apportioned on a kilowatt demand basis. Where the consumer charge is used it has become customary to fix this consumer charge at about $12. You will, therefore, see that, if the maximum demand is four-tenths of a kilowatt per consumer, it amounts $30 on a demand basis. In other words, $12 per consumer, plus $30 per kilowatt of maximum demand, would yield the same revenue as if no consumer charge were made as against a $60 charge per kilowatt of maximum demand; and in the case of three-tenths of a kilowatt per simultaneous maximum demand the consumer charge at $12 would enable service to be sold at $12 per consumer, plus $24 per kilowatt of maximum demand.

I appreciate that it is bad form for the writer of a paper to apologize for the inadequacy of his paper, but this paper was written under great stress, and if it appears in printed form it will be due to the hurried work of the Boston printers since my arrival in this city. The importance of the subject deserves more careful treatment.

It was my intention to treat this subject in an elementary way so the fundamental principles would be understood by those who have not heretofore had the problem brought to their attention, believing that much interesting matter might be brought out in the discussion and that this discussion might stir up enough interest to cause this Association to further prosecute this work. I had also intended to give a brief bibliography of the rate problem, but I find that the recent publications on this subject have been far more numerous than I expected.

To those who wish to study the rate problem, I append a bibliography which was prepared in 1906 for another association by a committee on rates, of which I was a member. Some of these papers, however, have only a remote bearing on the subject. I would particularly advise that Dr. Hopkinson's paper on rates be read. This paper appeared in the London *Electrician*, November 11, 1892, and was republished in the *Electrical World*, August 3, 1907.

[The paper concludes with a tabulation of articles and references (97 in all) to the matters described by the author.—Eds. A. G. L. J.]

(To be Continued.)

[Continued from page 460.]

## THIRD ANNUAL MEETING, INDIANA GAS ASSOCIATION.

Held in Fort Wayne, Ind., January 18th and 19th, 1911.

### First Day—Morning Session.

*Discussion on the Eves Paper.*

The President—Gentlemen, we have listened to a very interesting and instructive paper by Mr. Eves. While its title is the "Value of Instruction in the Operation of Gas Appliances," the paper itself is sufficiently broad and comprehensive to cover practically the entire commercial end of our business. Whatever Mr. Eves undertakes he tries out thoroughly, and I want to state that he undertakes about everything there is that will increase the business. I am very sure not one of you here failed to gain some information from the Eves paper. There is so much to it that I am afraid I will have to limit the discussion.

Mr. J. R. Cunningham—I want to give our hearty indorsement to the writer, who covered the ground so thoroughly as to leave very little room for a man in my position to say much. That part of the paper referring to high-grade gas appliances strikes me. It has been close to my heart for years, and I have always believed the sale of high-class appliances was more necessary to the gas company than to the manufacturer, wherefore, that part of it should be taken to heart by every buyer. We must remember the old adage, "Quality is long remembered after price is forgotten."

Mr. Travers—The paper we have just heard read seems to me of vital importance to the members of this Association. I am sure I voice the sentiments of the other members present when I say it is the most extensive and helpful paper on this question to which it has been our good fortune to listen. The writer from his large experience can always be depended upon to give us all very sound and profitable advice along these lines. It is my good fortune to be associated with Mr. Eves, consequently I know something of his methods, and know what he had done along the lines advocated in his paper, for our company. From my observation there is nothing that a gas company can do to lessen complaints of gas patrons and to make more and

better satisfied consumers, than the employment of women and other instructors in the economical use of the gas range and other gas appliances. From personal experience it has worked wonders in Indianapolis. Our two women instructors follow up all sales of gas ranges, and give practical demonstrations and advice in the economical use of the gas range. I would particularly call your attention to that part of Mr. Eves' paper relating to the educational campaign which is being carried on in Indianapolis through the giving of cooking lessons in the various churches, schools, hospitals and benevolent institutions, by competent women instructors. For illustration: We have in Indianapolis a large correctional institution for young girls (Home of the Good Shepherd) conducted by the sisterhood of like name. In that institution our Company is giving, as in former years, a course of instruction to a class composed of 120 girls. I have visited the institution frequently, and it has been my pleasure to meet the good Mother Superior. It is an extract from a letter from her to our Company which Mr. Eves quotes in his paper, which says: "You are doing a great work; but you cannot fully understand as we can all the good you are accomplishing, and the great value to the girls and their employers of the instruction you have given." Some might say that it is a very charitable thing for your Company to do, but I don't believe they derive a great deal of benefit from such work. Let us analyze and see to what extent the Gas Company is benefited by such instruction. Mr. Eves says regarding this same institution that within 6 months of the close of the course of 14 cooking lessons, 32 girls who attended the classes went out as servants in homes. Domestics, who have had the training in the proper care of the gas range, in its economical use and in the preparation and cooking of the different foods. This cannot but redound to the credit and welfare of the Gas Company. You can, therefore, see while we are doing a great deal of good for the young women of this institution, we are also helping our own cause and our consumers receive the direct benefit. I speak from personal experience when saying I cannot emphasize too strongly the necessity for the educational work by the gas companies of our own State. It will foster a better feeling for our companies, at the same time giving you the desired results. A more universal knowledge of the management and economical use of the gas range and other gas appliances would have a great influence on the amount of the sales and the good feeling toward the gas companies.

Mr. O. O. Thwing—Will you allow me to interrupt for a moment? We are going to pass the registration list around and would ask everybody, whether members of the Association or not, to sign this list, so that they can receive their cards for the entertainment and cards to the clubs of Fort Wayne.

The President—We have with us one who has had practical experience with the gas companies, and I believe has also had some with the manufacturers. I should like to have a few words from Mr. Strain, of Detroit.

Mr. J. R. Strain—I don't know what I could add to Mr. Eves' paper, for by it he has practically covered every point you could think of in that department. I would like to call attention, however, to a paper on "Water Heaters," read at the Boston meeting of the National Commercial Gas Association, which notes a feature that is going to be a very valuable thing for gas companies in connection with water heaters in the future. That paper shows a tank, or an ordinary 30-gallon boiler, having a tap within 2 or 3 inches from the top for connecting the outlet from the water heater. That saves a great deal of trouble in connecting the heater in the first place and adds somewhat to its efficiency. It will, of course, have to be developed through the manufacturers of boilers. It is impossible to tap a boiler after it is installed in this manner, but after starting a campaign with the plumbers, getting them to specify boilers with this small tap, they will, when they come to set a water heater, save much time and the heater will show a higher efficiency. Another feature worth speaking of: The hotel, closed-top range business is being rapidly developed all over the country. When you try to interest the chefs and buyers of the hotels in our ordinary domestic range on a large scale, naturally they are opposed to it, but this closed-top range has made it possible for us to retain this business to the satisfaction of the most particular chefs in the country and to our profit. That business, although sometimes very difficult to obtain, can be secured at very small cost to us, because the hotel or restaurant is on the lines of old mains. A service is in the building, so it is not like running an extension of the main service, etc. From hotels and restaurants doing cooking by gas, the revenue is increased very rapidly, and, after one or two installations, it grows itself. In several cases they come to us for it. The hard part is to get the business started. It is a pretty crude proposition to sell these hotel proprietors a range from a photograph. The practical way to do it is to show them ranges either in use or on your floor.

The President—Our Association is made up of a great many small gas companies and I think we would be interested in having a few words from some of their representatives. There surely must be some points on which they would like to bring out some information.

Mr. H. L. Schutt—I am heartily in accord with that part of Mr. Eves' paper relating to high grade appliances and which won Mr. Cunningham's commendation. I find, in a great many cases, when the travelling man comes in to sell goods to the different purchasing agents of the gas companies, the price seems to be the point rather than the quality. I think we must all try to get away from price consideration and try to get the most valuable qualities in the goods. I heartily indorse that part of Mr. Eves' paper—in fact, all of the paper—but that is the detail coming closest home to me. [Applause.]

The President—Quite a part of Mr. Eves' paper was devoted to the matter of the incandescent gas light, particular stress being placed on maintenance. I would like to hear a few words from Mr. MacNab on this subject.

Mr. MacNab—I heartily indorse Mr. Eves' paper and think in selling a great many appliances we do not give enough instruction to the consumer in taking care of that appliance. In putting up an arc light our consumers are instructed that the pilot may go out, and that it is a very simple matter to relight it, showing them how it is done. If this were always done when a light of that kind were sold it would save a great many complaints. Quite frequently you find pilots have gone out and the customer condemns the whole light simply because of that extinction. We have a great deal of trouble with consumers taking care of their own appliances. They think it can be done better by themselves, and the consequence is that it is not done at all. The lamps are neglected until they are almost useless.

Mr. Cooke—The Eves paper is certainly good in every respect, but it seems he could add one more point to make it even more valuable. He treats entirely with the efforts to obtain business, the necessity of instructing the consumer in the operation of the appliances and taking care of complaints that are received; but I believe the time is rapidly coming when the success of the domestic appliance industry and business will depend largely on the efforts of the company to anticipate any complaint through the use of voluntary inspectors. It may mean a little expense in employing people who are competent to inspect the appliances, but I believe the increased consumption of gas would more than offset that expense, in addition to which you would have a more satisfied class of customers. They would not have a chance to complain, and I think that brings us to the subject of service, as referred to in the paper. The gas company of to-day is rendering service and it must take the necessary steps to make that service complete and satisfactory in every respect.

Mr. Schutt—As to the matter just spoken of, the Consumers Gas Company, of Toronto, has the maintenance proposition on domestic appliances worked out and it has been in use now for about 7 months. Mr. Hewitt, the Manager, told me recently that his inspectors found over 14 per cent. of the ranges in use had the burners plugged up and appliances practically only giving half results. Since this maintenance proposition went into effect his complaint department has received practically no complaints, consequently he is very well satisfied with it and the gas consumption has increased on domestic appliances. They inspect 3 times a year; once every 4 months.

Mr. Dunbar—Mr. Eves spoke about the value of instruction, and that appealed to everyone of us. The paper will be to us an inspiration; but when the Indianapolis Gas Company sells a range to a customer who has never before used one, what is done to instruct that customer? Does the man who instals the stove give the information, or is a special instructor sent out? It seems to me it is of vital importance to begin right with the customer and that he should be instructed. How to do that is the point I raise and that I wish information on from Mr. Eves. He also spoke of the installation of kitchen heaters. I should like a little information also on that point. Does he use the coke attachment to a stove? If so, is a gas igniter a part of the outfit? We cannot handle the kitchen heater with a gas igniter. Does he have any trouble in keeping a coke fire in this heater over night?

The President—Mr. Eves will answer these questions in his closing talk.

Mr. Beck—I would like to add a few words respecting the field under discussion. The greatest disadvantage of the incandescent gas

light compared to the electric lamps, is the consumer must touch the mantle light every time he lights it, either with a chain or with a match, which tends to destroy the mantle or break the burner. When a light is lit it is exposed to danger. A principle that has been worked in our incandescent lights for about 10 years with very great success, in Europe and here, is an automatic pushbutton worked by air pressure and air suction. It seems that this is a thing which the smaller gas companies are admirably adapted to introduce to the consumers. In larger cities where the population is shifting such a device has not much chance of being introduced, but with small gas companies, where the population is stable, an appliance of this kind will give service for a lifetime, or at least for a number of years. It will add greatly to the consideration gas light gets, not only for illumination, the very point the gas people are always talking about, but it will put gas on an equality with electricity in the matter of convenience in a way that has not yet been accomplished.

Mr. Maxon—As a newcomer in the Indiana field, and taking up the operation of a natural gas property for which we will have to substitute an artificial gas plant, the feature of the Eves paper that appeals to me is the statement that there are progressive operators in Indiana who are willing to allow the small operators to benefit by co-operating with them in maintaining a force of skilled instructors. In converting a natural gas plant to an artificial one, I think the matter of instructing consumers is one of great importance and that a campaign of education is necessary. Therefore, this feature of the paper appeals to me very much. Our company will be pleased to cooperate in any plan that may be devised whereby a strong corps of skilled people may be maintained to operate in this State and to assist financially and otherwise to devise and carry out such plan.

The President asked Mr. Eves to close the discussion.

Mr. Eves—I had provided two other short papers, one by Mrs. Hawkins, an instructor of the Indianapolis Gas Company, the other by Miss Mabel Willcut, one of our instructors, who has recently been graduated from the domestic science college, of Rochester, N. Y. These ladies give their peasonal experiences from actual contact with consumers. It may be interesting to you to know what their difficulties are. These papers will be filed without reading. You will find them in your "Proceedings" when you receive them. Mr. Dunbar inquires how instruction is carried on in the case of a consumer who buys a gas range. I claim that no instruction can be given without it is given systematically, therefore, as soon as a sale is made in our store, a "gas appliance instruction card" is made out for the purchaser of the gas range, and within from one to two weeks from the delivery of the gas range a call is made by one of the expert instructors, who begins, according to the list of instructions, to demonstrate the gamut of the range from the burners to the close of the cooking in the ovens. That occupies some time, but gives the consumer a good start, preventing those failures which, very often in the old times, resulted in the discontinuance of the use of the range, or in non-payment of the bill. The kitchen heater which Mr. Dunbar mentioned is advocated by us, and we have a considerable number of kitchen heaters, called coke attachments, that stand alongside the gas ranges and are used to supplement the heating arrangements of the house when a gas range is used for cooking in the winter months. This gives us considerable advantage in Indianapolis, because a large number of people cook on gas ranges in the winter who formerly reinstated their old coal ranges in order to get comfort in the kitchen from the heat. We do not as a rule find that the "igniter" is a desirable adjunct to the kitchen heater, and we have difficulty in causing the igniter to light up gas coke, but as gas coke is what we want the people to use in the kitchen heater, we have not had many kitchen heaters in use with the so-called igniting device. I prefer to have the kitchen heater lighted and kept going, because it can be used not only during the day, but, as Mr. Dunbar inquired about, through the night also. We have reports from nearly all installations of kitchen heaters, and find very few instances where the people have not been successful in keeping the heater going throughout the night, where they have desired to do so. I thank you, gentlemen, for your cordial reception of my paper.

### Miss M. Wilcut's Experiences as a Demonstrator.

In Indianapolis I have found conditions different in many ways from those existing in other cities I have visited. This is owing to the large amount of systematic educational work carried on for a number of years. In following the sales of new ranges one comes in contact with inexperience as a rule. I often find these women baking on the very bottom of the range, using both oven burners at the same time. Of course, the biscuits, or whatever is being baked, burn to a crisp on the bottom, and if they are not brown enough on top they are set into the broiler. It is very hard to convince women they need use only one oven burner after the oven is once heated. They would lay iron heaters, asbestos mats, and even sheets of asbestos on the bottom of the oven, to keep things from burning up, rather than turn the gas down and reduce expense as well. Another fault, they must look into the oven every few minutes to see what is going on. I sometimes wonder if they think the cakes, etc., will get away. They do not stop to think that each time they open the oven door they are lowering the temperature of the oven and delaying the baking. Besides, they might open the door before the cake is set, and then wonder why it falls. Some women seem afraid of the broiler. They leave so much fat on the steak, chop or whatever is being broiled, and then set it so close to the flame that this fat soon catches fire. One lady told me she was afraid to go near the stove, so she just let the chops burn up. After having the broiler explained they seem to think it would be very nice to use it, and the broiler thus becomes a favorite in the kitchen. It seems that most anyone could learn to use the top burners economically, but I often find kettles boiling away on the large burner when the simmerer would keep the water boiling quite as well. People tell me they never knew there was any difference in the size of the top burners, and find they have been using the largest one for nearly everything. When I ask them if they use the simmering burner, the reply often is, "Oh, yes; for coffee!" Another thing one would be surprised to find is the condition of some of the ranges. Some are bright and shining, while others are sometimes hard to find, on account of grease and rust. When I tell them that if they expect good work from a machine it must be kept clean, they take it in good part. Sometimes we are met very discourteously at the door, and some women are almost insulted at the thought of anyone telling them how to use a gas range; but before I leave them they seem quite pleased, and, I think, in 9 cases out of 10, they become more loyal patrons of the gas company for the help they have received.

### Experiences by Mrs. D. A. Hawkins.

My experience with women whom I have visited to instruct in the use of the gas range varies very considerably. We find a few who understand using the baking and broiling ovens of their gas ranges and have splendid success with both. Then, again, there are those who, having used a gas range for several years, always placed their baking on the bottom of the ovens and burned everything they tried to bake. Our instruction has cured this trouble, though no trouble to themselves, but with some saving of gas. We find some people actually trying to bake in the broiling oven, and many who would never use the broiling oven at all until we explained the value of the broiler for steaks, bacon, etc., and as a gas saver by doubling up the work. The use of the broiling oven for the searing of roasts while baking is being done in the upper oven is of great importance to everyone possessing a gas range. Most women seem perfectly amazed when we speak of cooking vegetables and fruit in the oven while roasting meats. This saves so much time and fuel that the information is greatly valued by everyone, but is not at all generally known. We find a great many who do not know that they may turn one burner out when baking. They frequently tell us that a loaf cake, for instance, cannot be baked without burning, and when we ask how they have regulated the oven they acknowledge they used both burners turned on full, thus wasting gas and getting unsatisfactory results. We frequently find women who are very successful with almost everything they bake except biscuits and cookies, two common articles of food that are greatly appreciated everywhere. When we explain that biscuits and cookies should be baked in a shallow pan, and that a pan with the ordinary side will prevent the heat from getting to the bake, they acknowledge that that is exactly where their mistakes have been made; they have been baking in too deep a pan. These may be simple points, but they are very important ones in trying to get the very best of service and results from our appliances. The majority of women are very extravagant in using the top burners and will not, without the proper instruction, use the smaller burner instead of the giant burner to do the greater part of their work. The use of the simmering burner, which saves so much gas and does most valuable work, especially in the preparation of soups, etc., is very seldom understood unless we have given them actual experience and instructions in its use. These little savings give consumers a normal gas bill and prevent extravagance and constant complaints of too high a cost for cooking.

A newly married young lady, with little or no kitchen experience,

asked me how long she ought to roast a 25 cent roast, and when I told her that 15 or 20 minutes was sufficient, she said, "Just think of it; and I've been roasting it 3½ hours."

The President—We will now have the joint paper by Mr. J. W. Dunbar and Mr. Davis, which paper, I understand, is in two sections, Dr. Dunbar taking up the practical end, Mr. Davis the theoretical end of the subject.

Mr. Dunbar then read his section of the paper entitled

## THE RELATIONS OF HEATING VALUE TO CANDLE POWER IN COMMERCIAL WATER AND COAL GAS.

Emerson in one of his essays advises youth to hitch his wagon to a star, in order that his fate and destiny may partake of its magnificence, glory and splendor. Unfortunately for me in my career, I have never had the opportunity so to do. This subject was suggested by me and probably for that reason I was associated with Mr. Davis. I have been very glad to have been so associated, because in my relation with him I have learned very much that has been useful and valuable.

The relation of heating value to candle power in a commercial gas until recently received no consideration. If there is a relation in value that balances there is no need for legislation or concern as to dual values to be contained. If there be no relation, proportionate to economical cost, then the single value, be it photometric or calorific, as required by the consumer, is the one to receive the greatest consideration.

The subject of calorimetry in the gas industry is each year requiring and receiving more attention and consideration, and, because of heat units instead of candle power being demanded, the heating value of the gas should be the determination of its value.

The American Gas Institute adopted the following definition of heating value: "The heating value of a gas is the total heating effect produced by the complete combustion of a total volume of the gas, measured at a temperature of 60° F., and at a pressure of 30 inches of mercury, with air of the same temperature and pressure, the products of combustion also being brought to this temperature. In America the unit of volume is the cubic foot, and we recommend that the heating value be stated in terms of British Thermal Units per cubic foot of gas."

A British Thermal Unit is the amount of heat required to raise the temperature of 1 pound of water 1° F. This applies to pure water having a temperature of 39.1° F., but practically the amount of heat required to raise a unit of water 1°, between 39.1° and 212° F., is nearly the same. Sixty degrees F. and 30 inches of mercury are the average conditions most generally met with in practice.

Heating values are also expressed in terms of calories in which the metric system of weights and measures is used. A calorie is the quantity of heat necessary to raise the temperature of a kilogram of water from 0° to 1° C., but is practically applicable to the raising of the temperature of water 1° between any variation of water temperature up to 100°. In America and England the heating values of gases are stated in terms of B.T.U.'s.

The terms gross and net heating value of gases are sometimes used as distinguishing terms. This is wrong. There can be no net heating value. A cubic foot of gas will, when burned under proper conditions, give an exact and definite amount of heating effect due to the composition of the gas; no more and no less. A gas of 600 B.T.U., burned in a gas heater in a room, the temperature of the air being 60°, the products of combustion remaining in the room will, if the combustion of the gas is complete, produce 600 B.T.U. of heating effect for every cubic foot of gas consumed. The net heating value of gas is the gross heating value from which is deducted the latent heat of the water of combustion, which is liberated when the products of combustion are cooled below 212° F., but in the above method of burning the gas this heat is all utilized and there can be no reason for its not being considered a part of the heating value of the gas.

From the time of the introduction of gas for illumination until to within the last few years the value of a commercially pure artificial gas was determined by its candle power, and for coal gas 16-candle power was ordinarily the requirement. With the introduction of water gas, with its higher possible lighting effect, it was practical to furnish a 20 to 22-candle power gas, and with the lava tip burners then universally used there were advantages to the consumer in obtaining this increased lighting effect. Municipalities, in granting franchises, sometimes stipulate the candle power standard, and no gas that produces less than 16-candle power, as determined by accepted photometric tests, was considered standard.

In England, Parliament by enactment has recently reduced the candle power requirement from 16 to 14-candle power. This was done because of the recognition of calorific value in preference to candle power value. The control of prices charged by the gas companies of the British Isles is vested in a commission, or commissioners, working under the direction of Parliament. Gas companies are permitted under certain conditions to increase or decrease the cost of gas to consumers. The incentive to reduction in price is the increased dividends they are permitted to earn, so there is an incentive for all gas companies to sell their products at the lowest possible price so they may have increased sales and increased dividends.

The permission to furnish a 14-candle power instead of 16-candle power gas was granted because, by furnishing a 14-candle power gas, due to decreased cost of production, the gas companies were enabled to sell a greater number of heat units for a shilling than when they were required to produce a 16-candle power gas, and because there was no proportionate relation that was constant between the candle power and calorific value.

Formerly nearly all gas was used for illumination in lava tip burners. The change was desirable because of lighting, due to heating effect and because of the heating value being the only standard for cooking and domestic heating.

Within the last 15 years changed conditions have made the candle power value of a gas of less consideration than its calorific value. Gas consumed in an Argand or lava-tipped burner, if of good design and condition, gives a lighting effect proportionate with candle power. To-day it is almost safe to assert 90 per cent. of the gas used for light is consumed in Bunsen burners, in which the caloric effect of the gas is depended upon for the purpose of heating a substance to incandescence; such is the type of burner and mantle commonly known as the Welsbach lamp. In these lamps the illuminating value is of less importance than the caloric value.

During the last 20 years, and particularly in the last 10 years, gas has come into almost general use for summer cooking, and progressive managements are presenting its advantages for use for this purpose, especially in furnace heated homes, throughout the year. Gas stoves with auxiliary coal and coke heating devices are also recommended, which each year is resulting in its more general use. The various designs of gas-heating stoves are receiving recognition by the public, and their economy, convenience and adaptability for supplementary heating are becoming so recognized that the sale of gas for this purpose is largeiy increasing. Devices for heating water for household use are so numerous, and their working so instantaneous, effectual and cheap to operate, that no home, in which the occupants pride themselves on their household conveniences, can be without them. All of these require a commercial gas of heating effect regardless of the candle power. Natural gas, containing 50 per cent. more heating value than is possible to produce in an artificial product, was practically non-illuminating.

The condition to-day that confronts the company and the consumer is what shall be the standard. Less than 10 per cent. of gas used depends for its efficiency on its candle power. The 5 or 8 per cent. used in approved Bray, lava tip burners is so small a proportion that a reduction of from ½ to 1-candle power per foot can be of no serious import, if the cost of producing that additional ½ or 1-candle power is to be obtained at an increased cost wholly disproportionate with the increased light obtained, and when it is remembered that lava tip burners often, due to condition, sometimes produce but 50 per cent. the light possible when gas is burned in efficient lava tip burners, it is readily seen that, to maintain a higher standard of illumination to supply 5 or 8 per cent. of the demand, is unnecessary and costly. It seems justifiable then that that quality of gas best suited for requirement should be a product that gives the consumer the greatest heating value for his money. To furnish a 20 candle power coal gas at 650 B.T.U. in preference to a 15 candle power of 600 B.T.U., or a 23-candle power water gas of 670 B.T.U. in preference to a 19-candle power water gas of 600 B.T.U., would cost so much more per unit of light and heat for the former, in each instance, as not to justify the municipality in demanding the former. The Wisconsin Railroad Commissioners, under whose direction gas companies maintain standards, have given the following as their reason for enactment:

"Under conditions governing the use of gas in Wisconsin, it appears by far the largest amount is used for purposes such that its heating value is a measure of the serviceable value of the gas. There is a small percentage of gas consumption, believed to be materially under 10 per cent., which is used in open flame burners, and in which the candle power is a measure of value. This percentage is continu-

ally decreasing, due to the increasing use of the incandescent mantle. It appears that a calorific standard may be of far greater service than the commonly used candle power standard.

"In general, it may be stated that, other things being equal, gas is of the greatest value which has the greatest number of heat units per cubic foot, and it is possible to obtain a gas which has 800 or more B.T.U. per cublic foot. Such a gas is more costly, however, to the consumer, on account of the disproportionate expense of securing the high heating value. It is believed that the heating value standard adopted should be that value which will give satisfactory service in the forms of appliances commercially in use and that it shall be such value as may enable gas to be sold at the most reasonable cost to the consumer. A value of 600 B.T.U. per cubic foot is believed to meet their requirement fairly well. * * * It is possible by the use of a good grade of coal, and by the exercise of good manaaement, to secure a heating value of about 600 B.T.U. Plain water gas has a much lower value, which is usually raised by enrichment to 600 B.T.U. or upwards. * * * The following regulation is suggested as providing adequate gas service from the standpoint of heating value.

"Rule 8. The company furnishing gas, which, within a 1-mile radius from the distribution center, gives a monthly average total heating value of not less than 600 B.T.U., with a minimum which shall never fall below 550 B.T.U., may be considered as giving adequate service as far as the heating value of the gas is concerned."

*Candle Power.*—For reasons previously outlined, it appears that the candle power standard, which has been almost universally used in the past for gas measurements, is of minor importance in this State. It is possible to secure a high candle power gas which has but a moderate heating value and to require companies to maintain a double standard which shall insure both the high heating value and a high candle power, would surround them with such restrictions that economy in manufacture might not be attained, and since but few consumers would be benefitted by a candle power restriction, and with this number continually decreasing, no regulations as to candle power are prescribed at this time. It should be added, however, that with a 600 B.T.U. heating standard, and in view of the conditions under which gas is being manufactured in this State, a fairly satisfactory illuminating value is insured. It is hardly possible to manufacture a coal gas of 600 B.T.U. which shall not have a candle power from 12 to 16 or even more. The enrichment of water gas up to 600 B.T.U. will insure an even higher candle power.

In Massachusetts the requirement as to value is as follows:

"If the gas of any company, or of any city or town supplying gas, is found on 3 consecutive inspections made within a period of 3 consecutive days, to give less light than 16 standard English candles, or upon such averaging of inspections as the Board may prescribe, to be below the standard of purity fixed under this act, unless such defect is, in the opinion of the Board, due to unavoidable cause or accident, a fine of $100 shall be paid by such company, city or town, into the treasury of Commonwealth."

So far as I know, Wisconsin and Massachusetts are the only States that require a standard; the former is the heating, and the latter the candle power value. The reasons set forth in support of Wisconsin's law are conclusive, and were determined by the testimony of professors of its State University, as well as by practical expert engineers. The Massachusetts standard of value was determined upon before so large a percentage of gas consumed depended upon its heating effect. To-day conditions everywhere exist as they do in Wisconsin.

Mr. Davis, who has conducted experiments, finds there is no proportionate relation as to heating and candle power values in commercial gas. Of course, the higher the candle power averages the higher the heating power averages, but individual tests show constant standards cannot be maintained.

At least 4.5 of the total heat produced by the combustion of a cubic foot of gas is due to constituents that furnish very little light, and nearly all of the light is produced by constituents which furnish 1.5 or less of the total heat. Further, a gas high in candle power is with difficulty economically consumed with all the attending cleanliness characteristic of gas for cooking. To maintain a double standard would be as fatal to gas companies as it was to one of our shining lights in American politics; a 16 to 1 monetary system is no more sought for now than a candle power and heating value will be contended for 10 years from date. In the meanwhile we must be impressed with the wisdom and fairness of the heating value standard.

From the catechisms of central station gas engineering, Prof. V. B. Lewes is quoted on giving the following table as the average relation between candle power and calorific value, and although Prof. Lewes admits the result in any particular case might vary 5 per cent. either way, even with this qualification, exceptions were taken to the figures by gas engineers.

| Candle Power. | Calorific Value. Coal Gas. | Water Gas. |
|---|---|---|
| 12 | 540 B.T.U. | 490 B T.U. |
| 12 | 560 B.T.U. | 510 B.T.U. |
| 14 | 585 B.T.U. | 529 B.T.U. |
| 15 | 610 B.T.U. | 547 B.T.U. |
| 16 | 625 B.T.U. | 567 B.T.U. |
| 17 | 647 B.T.U. | 587 B.T.U. |
| 18 | 670 B.T.U. | 607 B.T.U. |
| 19 | 690 B.T.U. | 627 B.T.U. |
| 20 | 712 B.T.U. | 647 B.T.U. |

The above results are obtained from English coal. From the best grade of American bituminous coking coal no higher average than 16-candle power and about 600 B.T.U. can be obtained and then subject to great variation.

In water gas, while it is possible with great variation to obtain 20-candle power gas of 647 B.T.U., yet it is impossible in a straight coal gas, and it is true that the increased cost of additional candle power and B.T.U. are only obtainable by enrichment that makes the price disproportionate. The double standard would, by reason of variation in productive cost, due to maintaining the minimum standard in one line, often cause the second standard to be excessively high with its increased excessive cost.

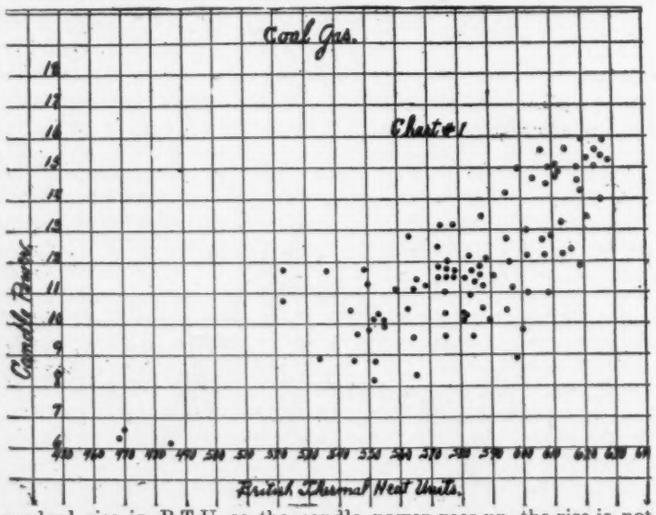
Our contention, because of consumers' requirements and economical production, should be that standard the greatest number of our consumers require, and the standard value should be that at which the greatest number can be obtained for the lowest unit of cost. More than 90 per cent. of the gas sold is dependent for its value on its calorific and not photometric value; 600 B.T.U. is the greatest average to be obtained from coal gas. By use of enrichers more may be obtained at a disproportionate cost per B.T.U. It would seem, therefore, there is a necessity and demand for but one standard of value, and that heating value be that standard.

Then followed the section of the paper prepared by Mr. A. B. Davis.

Mr. Dunbar has shown the necessity of the gas men taking a definite stand as to the method of placing a value on commercial illuminating gas. While we do not dream that this investigation will settle the question, it will be another cog in the wheel which will be complete only when our work has been corroborated by a number of other investigators.

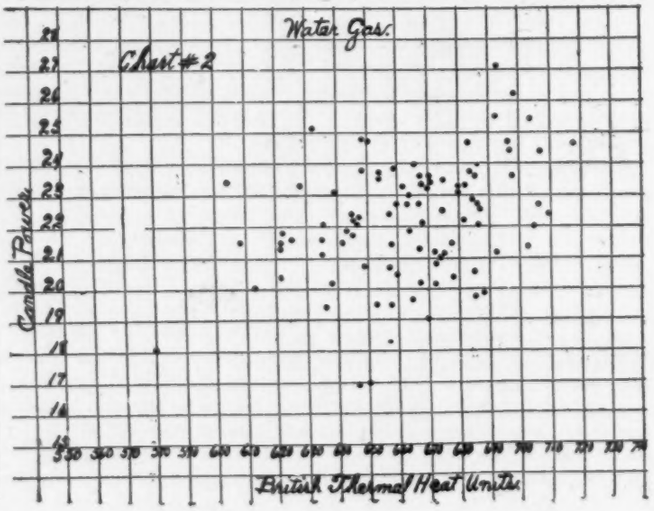
In order to find whether there existed a relation between the heating value and the candle power of coal gas, water gas and mixed gas, we have taken a large number of tests of the three gases, both for candle power and heating value, and tabulated our results on plotting paper. Each dot on the charts represents a determination of heat value in British thermal units and the candle power of the same gas. If there is a relation existing between the heating value and candle power, all of the dots should fall in line, and the line should be straight. In that case, the heating value in B.T.U. divided by the candle power, or the candle power divided by the heating value in B.T.U. should give constants that would not vary.

Chart No. 1 shows a number of tests of coal gas. While there is a



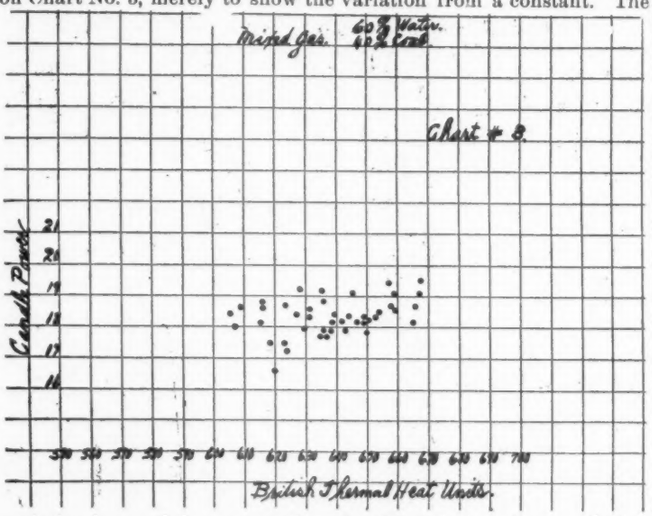

gradual rise in B.T.U. as the candle power goes up, the rise is not definite and no relation can be stated with any degree of certainty, and no definite constants can be calculated.

Chart No. 2, the tests on water gas, show a still wider variation



from any constant, and the only conclusion to draw is that the B.T.U. and candle power, taken on any special test, bear almost no relation to any following tests.

When this work was started a considerable number of determinations were made on the mixed, or commercial gas, but on finding such a wide variation in the water gas we abandoned further tests on the mixed gas, since it contained about 60 per cent. water gas, and if there were no relation in the water gas, there certainly could be none in the mixed gas. We have tabulated the results on the mixed gas on Chart No. 3, merely to show the variation from a constant. The




variation here, while not so wide as in the water gas, is nevertheless too wide to show any constant relation, and the fact that the variation is not as wide as in either the coal or water gas is due to a far more even candle power being maintained at the works, and also because the commercial gas, on which the determinations were made, was taken from a 3,000,000 foot capacity holder, where the gas had an opportunity for much more thorough mixture over a period of about 18 hours.

All of these results correspond exactly to theory and were to be expected when we consider the conditions that would cause such variation. In the coal gas, the following conditions would cause a variation in candle power:

1. Variation from a constant temperature in retorts.
2. Variation in quality of coal or locality from which it came.
3. Variation in pressure in retorts.
4. Variation in temperature of condensing house.
5. Variation in temperature of purifiers.

Let us see why all this variation takes place. As a general rule low heats and long hours coking give a higher candle power gas than high heats and short hours. One of the vital factors in the candle power of coal gas is the percentage of benzine it contains. This usually amounts to from 8 to 2 per cent. by volume of benzine in the form of vapor. If a very high temperature prevails in the retorts, the benzine, or a large part of it, may be polymerized to naphthaline in the following manner:

The formula for benzine is $C^6 H^6$. (See Fig. 1.) If benzine vapor be passed through a tube heated to a high temperature, we get naphthaline. (See Fig. 2.)

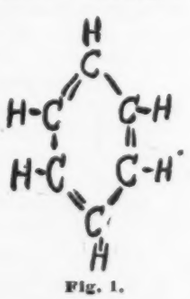


Fig. 1.

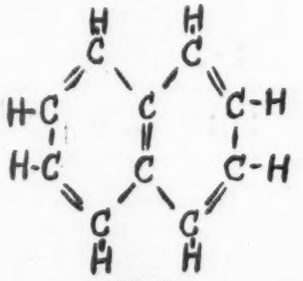


Fig. 2.

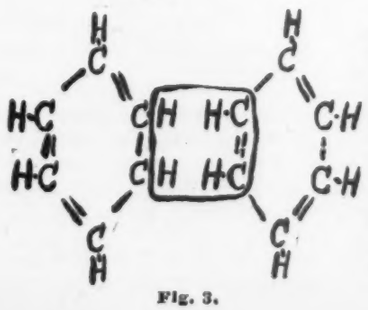


Fig. 3.

In a red hot tube, or in contact with the hot walls of a retort, two molecules of benzine join together to form naphthaline with the elimination of ethylene. (See Fig. 3.)

Acetylene, hydrogen and carbon as lampblack are also formed, due to the decomposition of some of the benzine, ethylene or naphthaline at the high temperature. The naphthaline condensing out robs the gas of some of its candle power, but certainly need not rob it of a proportionate amount of heating value.

There is no doubt that the quality of coal causes a variation in candle power. We know that, everything else being constant, Indiana and Pittsburgh coals yield gas of a very different character, the Indiana coal gas being much higher in hydrogen and carbon dioxide than the gas from Pittsburgh coal. There is no reason why even coal from different parts of the same mine should not yield gas of varying candle power and B.T.U. relation.

We know that the retort house, run carefully on a very light vacuum on the retorts, gets a higher candle power gas than when the house is run with a pressure on the retorts, the rapidity with which the gas is taken off causing the candle power to rise or fall, but the B.T.U. need not necessarily rise or fall in proportion.

The temperature of the condensing house has much to do with the coal gas candle power, especially such apparatus as the tar extractor, which, if run at too low a temperature, illuminants are absorbed by the tar, but the B.T.U. need not, by any means, fall in direct proportion, since the tar takes out the very substances which add most to the candle power.

The temperature of purification may have a very slight influence upon candle power, since the woody material contained in most oxide absorbs or gives up benzine according as the temperature of the boxes rises or falls, but the B.T.U. need not necessarily rise or fall in proportion.

Taking all these conditions into consideration, we could not expect other than to find that there was no constant existing for the relation of B.T.U. and candle power in coal gas. Now let us consider the variations or cause thereof in water gas. The main causes of variation are as follows:

1. Quality of gas oil.
2. Temperature of carburetter and superheater.
3. Quality of blue gas made.
   a. Condition of fire.
   b. Content of carbon dioxide.

In regard to gas oil, there are now so many different oils on the market recommended for use in water gas machines that it is often very difficult to judge which oil gives us the most for our money when we compare quality with price. The straight paraffine oils give the best results, and the results obtained following the use of oils of an asphaltic nature are good in inverse proportion to the amount of asphaltic materials contained in the oil. Asphaltic oils partially crack up at very high temperatures with the production of a very large amount of tar. We may illustrate the cracking up of straight paraffine oils by a few chemical formula.

A straight paraffine gas oil has a composition which may be represented by Fig. 4.

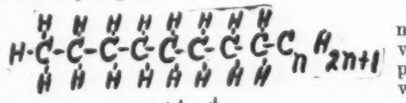


Fig. 4.

Many years of experimenting by numerous investigators has shown that paraffine oil cracks up best with the superheated temperature at about 1,470 F. At this temperature the maximum amount of oil is cracked, the least tar is produced, and a gas higher in candle power obtained. At this temperature, the oil may be said to crack up in this manner (see Fig. 5),

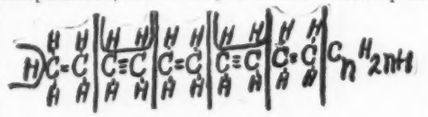


Fig. 5.

producing hydrogen in small amount, acetylene and ethylene in maximum amount and some marsh gas, that is, at this temperature the oil cracks up in such a way as to produce a gas of probably the greatest candle power of which the oil is capable of giving. At a slightly higher temperature, say 1,650°, the oil produces more tar, some lampblack, and the gas contains more marsh gas and hydrogen, and it may be represented as cracking up in this manner (Fig. 6).

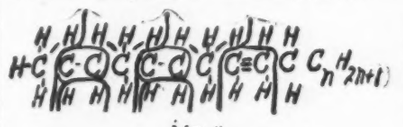


Fig. 6.

The resulting gas has a lower candle power than that of the previous illustration, but the heating value does not go down in proportion, therefore, the relation of heating value to candle power would not be the same. Consider what happens at still higher temperatures, say 1,800 to 2,000° F. The oil breaks up into lampblack and hydrogen, like this (Fig. 7).

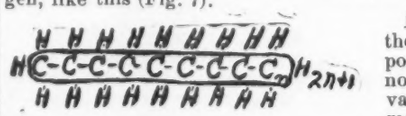


Fig. 7.

Let it be understood that the temperatures of decomposition given here are by no means absolute, since they vary with the size of the machine, the speed at which it is operated, and the spacing of the checkerbrick. At the works of the Indianapolis Gas Company, the latter form of decomposition was proven by running a 7-foot water gas set at a very high temperature, and although the usual amount of oil was used we obtained a gas which burned nearly blue. The gas was very high in hydrogen and no tar was produced, instead we soon blocked the seal pot with a mass of almost pure lampblack.

The carbon dioxide content of water gas seriously affects the relation of candle power and heating value, since over certain limits the

candle power falls 2 per cent. for each 1 per cent. of carbon dioxide contained, and the B.T.U. does not fall proportionately.

From the above evidence we can only draw one conclusion, that the candle power and heating value of either coal or water gas bear little relation to each other on individual tests, and the only correct valuation which can be placed is that based on the heating value. By averaging the candle power over a rise of 10 heat units, or the heat units over a rise of 1-candle power, we may prove that there is a gradual rise in candle power as the heating value goes up.

NOTE.—In this work a Junker's calorimeter of the latest type was used and every precaution taken to insure accuracy. The Hefner lamp, burning Kahlbaum's Amylacetate, especially purified for Hefner lamp, was used as a standard of light and the value of the lamp taken as .88 candle.

(To be Continued.)

## Latest Type of the Welsbach Junior.

[Prepared for the JOURNAL, by MR. W. L. DAY, of the Welsbach Company.]

"Practice makes perfect," says the proverb; only the omniscient could hope to produce a perfect piece of mechanism at the first trial, or, indeed, after any number of trials. The claim that any mechanical device is "perfect" simply means that the manufacturer has reached the limit of his skill and knowledge in perfecting it.

The Welsbach "Junior" has fairly filled the traditional "long-felt want," and filled it well; but 3 seasons' trial, besides demonstrating its general usefulness, also brought to light a few points showing where improvements could be made. The chimney as originally constructed, was 1¼ inches in diameter, so that the small globes made for electric lamps, which are built to fit a 2¼-holder, could be taken off without removing the chimney; but it has been found that this was not of as much consequence as had been assumed. All of this glassware has an opening at the top of at least, 3 inches in diameter, through which it is a very simple matter to remove a chimney when it became necessary to take off the globe for cleaning or replacement.

**Fig. 1.**—The Welsbach Junior Burner.

Taking advantage of this fact the chimney has been enlarged to 1½ inches in diameter, a plan which in that it insures a considerably longer life of the mica without cracking, has proven in every way, was satisfactory. It fact, chimneys that have been used in street lanterns for 9 months are still in good condition. The occasional discoloration and crackling of the chimney heretofore were undoubtedly due to the breaking of the lower part of the mantle at the level of the burner gauze, a breakage probably due to the fact that, between the bottom of the air holes and the bottom of the chimney, there was a space to which sufficient air could not get access to burn the collodion off the mantle, so that the portion of the mantle on which the unburned collodion remained dropped off; this allowed some of the flame to shoot out underneath the mantle and strike the chimney. This has been entirely obviated by the use of an improved collodion, which not only burns much more freely but does not cause trouble when left unburned. Furthermore, the mantle has been generally improved, giving now both a higher candle power and longer life.

**Fig. 2.**—Junior Burner with Ball Globe and By-Pass.

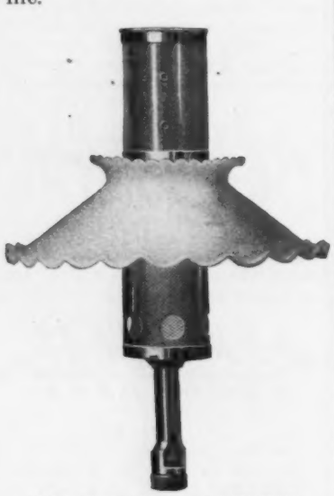


**Fig. 3.**—Junior Burner with Opal Shade.

With these improvements the present Welsbach "Junior" seems to be in pretty near as perfect a state as human ingenuity and deftness can bring it. At any rate, it is giving entire satisfaction, and can be pushed with the utmost confidence for the particular purpose to which it is adapted.

# Items of Interest
## FROM VARIOUS LOCALITIES.

THE Parker Russell Mining and Manufacturing Company has closed a contract with the Montreal Light, Heat and Power Company for the erection of 9 through arches and benches of 8 retorts each, the latter to be 20 feet in length. The contract covers the furnishing and erecting of the ironwork, in fact, everything complete. This means an installation equal to about 18 benches of single-eights, and the *per diem* output from the installation should be 1,000,000 cubic feet, approximately.

SALMON CITY, Idaho, wants a gas plant, likely of the producer type, so that merchantable use may be made of the great deposits of lignite available in that locality.

MR. W. A. HARVEY has been appointed Superintendent of the gas plant of the Decatur (Ills.) Railway and Light Company, succeeding Mr. W. L Powers, who has been appointed General Commercial Superintendent of the McKinley Syndicate properties.

THE gas plant at Nantucket, Mass., has been overhauled in every respect, the betterments including a bench of 5's, an exhauster, new purifying apparatus, etc. The Nantucket *Inquirer*, in noting the changes, submits the following plaintive conclusion: "Now, if the Company will hit upon some scheme which will prevent the electric lights from going out, just as the minister commences his sermon, or the High School graduate is delivering her essay, Nantucket's public lighting service ought to be beyond reproach."

WE are informed that on the 27th ult. the properties of the Hunts ville (Ala.) Gas Light Company were purchased by Mr. W. J. Holland, for transfer to a Philadelphia corporation.

MR. A. MONTGOMERY, of Northampton, Mass., has been appointed Superintendent of the Clinton (Mass.) Gas Light Company, vice Mr. George H. Barnes.

THE differences between the authorities of Taylorville (Ills.) and the Taylorville Gas and Electric Company has been settled. The adjustment brings with it a selling rate of $1.25 per 1,000 cubic feet, from the former figure of $2.25 per 1,000. A concession of about 25 per cent. in the electric rates was also granted.

PRESIDENT W. L. RICHARDS, of the Boston Consolidated Gas Company, has spiked some cheap legislative slush by announcing that the selling rate in East Boston will be 85 cents per 1,000 cubic feet on and after May 1st.

MR. A. S. B. LITTLE, General Manager of the Atlas Paint Company, of Nashville, Tenn., writing under date of the 3d inst., says that great interest has been aroused over the Company's campaign on account of introducing its pigments amongst the gas men. Many good trial orders, and several repeat orders, have been received from gas companies in the States and in Mexico. In another breezy note on this subject, Mr. Little writes: "Considering that at least 10 per cent. of the capital of gas companies is sunk in gasholders, and even as high as 20 per cent. where the gasholders are placed in steel tanks, it is incomprehensible why gas companies do not give the question of paint more serious consideration. Quite a number of gasholders can be seen which have been painted during the last 6 months and which are not in condition to withstand the atmospheric conditions. The consequence is that the gas manager cannot paint the holder again immediately, on account of weather conditions, and even if such conditions allowed, he would not have the necessary money at his disposal, with the result that the holder is left in a rusty condition for a run of 6 months. It is not to be wondered at, therefore, that the majority of holders are fit for the scrap heap or reconstruction a few years after they are built. The true possible life of a holder properly painted should be nearer 70 years than 7."

IT is our pleasant task to announce that Mr. John Connolly, the capable advertising manager of the Denver (Col.) Gas and Electric Company, is coming triumphantly out of his contest with pneumonia. He is convalescing satisfactorily in Spokane, Wash., and will likely be able to resume his work in Denver before May day.

MR. J. ARNOLD NORCROSS, the clever Secretary of the New Haven (Conn.) Gas Light Company, is making the trip with the party made

up from membership in the American Society of Civil Engineers, now on voyage of inspection to the Panama Canal. The journey will cover a month's leave.

"CALEB," writing from Bangor, Me., under date of the 4th inst., incloses the following: "Thinking it would not be amiss, I forward the information that, on the 27th ult., the Bangor Gas Light Company's Employees' Association was formed. The object of the Association is quite like that of Associations of a similar nature to those that have been so formed in the last year or so; that is, for advancement along technical lines. The Club proposes to hold open meetings and to maintain study classes, and from time to time to have competent authorities on the different branches of the industry instruct them through lectures and otherwise. At the initial meeting 30 members were enrolled, and the following officers were elected: President, Chas. Quimby; Vice-President, G. W. Parker; Secretary-Treasurer, L. A. Clark."

WITH regret we are called upon to chronicle the death of Wm. R. Perry, father of the wife of Frank Frueauff, General Manager of the Denver Gas and Electric Company. Deceased, who was one of the most prominent politicians in the State of Colorado, was in his 53d year, having been born in Hutchinson, Kas., January 31st, 1859. When in his second year, Mr. Perry's parents removed to Denver, and that city was the scene of his many activities to the end.

A CORRESPONDENT informs us that the Western Gas Construction Company is manufacturing a new type of ornamental electric street light posts, which type is arranged in a most artistic manner and under a plan that causes the lamps to be more efficient than any others that ever were put on the market. The post stands 12 feet 6 inches high, with provision for upholding 5 electric bulbs, one of which in center surmounts the other 4. The wiring plan is arranged so that all the lights can be maintained, or any one or more, as desired. In the decorating scheme flag holders are placed, that may be readily used on occasions of a festival sort. The column, head and base are of the Ionic-Greek type, the volutes and scrolls forming a most systematic ornamentation.

MR. WM. A. MORRIS, formerly in the commercial division of the business of the Milwaukee (Wis.) Gas Light Company, has been appointed Commercial Manager of the Wilmington (Del.) Gas Light Company.

THE Quakerstown (Pa.) Council has assented to the petition of the projectors of the Highland Gas Company, submitted by Secretary H. H. Ganser, by means of which the latter may operate in Quakertown for a term of 20 years, provided gas is supplied within 15 months from the signing of the grant. It is agreed that the selling rate shall not exceed $1.50 per 1,000 cubic feet. The gas will be supplied from the plant at Perkasie, Pa., now in course of construction.

IN the asking for bids for the public Lamps of Boston's streets of the gas type, the Rising Sun Company (the present contractor) was really the only bidder. Its offer was to maintain single burner lamps at the rate of $22.30 per lamp; if of the double type, for $35.16 per lamp per annum. The current or existing contract rates are, respectively, $23.60 and $35.70 per lamp. These figures include gas, ordinary repairs and lighting and extinguishing.

WRITE to the Welsbach Company's home offices for copies of its latest leaflet entitled "Modern Gas Illumination." It certainly "opens up" well and easily.

AT the annual meeting of the Columbia Gas and Electric Company, held in Cincinnati some days ago, the officers elected were: President, A. S. White; Vice-Presidents, R. W. White, J. C. Ernst and P. B. Enslow; Secretary and Treasurer, W. T. Hunter; Assistant Treasurer, Jas. Richardson; Assistant Secretary, Theo. Clauss.

A PHILADELPHIA syndicate has purchased the plant and franchise of the Helena (Ark.) Gas and Electric Company. The new owners will virtually reconstruct both plants.

THE Maysville (Ky.) Public Service Company has taken over and amalgamated the gas, electric and street railway properties of the named place.

"THE members of the commercial force of the Easton (Pa.) Gas and Electric Company were entertained by New Business Manager Quillan, the evening of February 26th. The entertainment was in the shape of a dinner that was heartily enjoyed. The scene of the festivities was Seip's Café, and the chief speechmakers were the host and C. Douglass Anderson. The souvenirs were briar wood pipes, and you may safely take it from me that we all had a good time.—V. M. L."

THE Fall River (Mass.) *Herald*, of the 2d inst., had this to say: "Employees of the Stone & Webster Management Association, which includes the Fall River Gas Works Company, has formed an employees association, to include the Company's men in Fall River and Pawtucket, R. I. There were 75 present, and those from Pawtucket and Woonsocket were entertained by their Fall River associates at a luncheon served in Agawam Hall, in which building the organization meeting was also convened. Mr. L. M. Bragg, of Fall River, presided, and a feature of the session was an address on the construction of gas stoves, by Mr. George E. Harris, of the Rathbone-Sard Company, of Albany, N. Y. The speech or address was delivered in good manner by Mr. Harris, who certainly knows all about apparatus of the gas consuming sort. The officers elected were: President, Cecil Brown, Pawtucket; Vice-President, Thomas Lyons, Woonsocket; Secretary, Robert Johnson, Pawtucket; Treasurer, James Eaton, Fall River. The organization is named the Triskillion Association."

MR. A. MONTGOMERY, formerly of Northampton, Mass., has actively taken up the duties of New Business Manager to the Clinton (Mass.) Gas Light Company.

MR. D. E. CALLENDER, Superintendent of the Racine (Wis.) Gas Light Company, has arranged the following schedule of rates, to become effective as named, in compliance with the decision rendered by the State Railroad Commission, notice of which has heretofore been given in the JOURNAL:

"District No. 1.—All bills for February are to be rendered at the old rate.

"District No. 2.—Meters will be read up to March 6th (average date) at the old rate.

"District No. 3.—Meters will be read up to March 15th (average date) on old rate, and credit will be given for these 15 days on the new rate, based on the average consumption per month.

"In District No. 4 the new form of bill with the new rate will be issued April 1, and so on."

The further explanations are made: That the meters now in use will be changed as rapidly as possible, so that readings will be made from only one meter, as the Commission stated. That it would be a physical impossibility for the Company to put the Commission rates into effect with all of its customers on the same date.

THE Common Council, Reading, Pa., is proposing to levy a tax upon the gas mains operated by the Reading (Pa.) Gas Company, according to the following text of an ordinance now being considered by it, at the instance of Alderman Ball: "That each of such gas mains and connections, laid or maintained within the limits of said city, shall be liable to an annual license tax of $20 for each and every mile of same." This action is evidently following the lead of the Allentown (Pa.) City Council, which body some time ago adopted an ordinance under which it is proposed to collect a like levy. The Allentown measure is now before the courts for construction.

MR. FRED. K. WELLS, Eastern Agent for the Pittsburgh (Pa.) Water Heater Company, writes us that this type of heater (of which 4 distinct styles are being made) is finding great favor in New England. The Bungalow type is especially acceptable in certain districts where small apartments or small dwellings are many, in that it is gotten out for 2 or 3 gallons per minute capacity.

THE Guayaquil (Ecuador, S. A.) Gas Company charges $3 gold per 1,000 cubic feet for its commodity (this includes a meter rental equivalent to 40 cents per 1,000) and is capitalized in $150,000. Its putput for 1910 was sufficient to enable it to declare a dividend of 15 per cent., to carry $15,000 to its reserve fund (the fund now amounts to $90,000), and to distribute $3,500 amongst its employees in the shape of gratuities.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHARLES H. WADELTON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
**No. 42 Pine Street, New York.**
**Telephone, John 2996.**

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance, Single copies, 10 cents.

The JOURNAL is the official organ of the NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

AGENTS:

*New York*—American News Company, 11 Park Place.
*Germany*—Lemcke & Buechner, of New York.
*England*—Aug. Siegle, 30 Lime street, London.

**DIVIDEND NOTICE.**

OFFICE OF THE UNITED GAS IMPROVEMENT CO., N. W. CORNER BROAD AND ARCH STS., PHILADELPHIA, March 8, 1911.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable April 15, 1911, to stockholders of record at the close of business, March 31, 1911. Checks will be mailed.

1830-5 LEWIS LILLIE, Treasurer.

MONDAY, MARCH 13, 1911.

## The Market for Gas Securities.

The vagaries of the general share market were many last week, but Consolidated managed to come out of the see-saw on the "ups." The opening to-day (Friday) was 140 to 140½, and the shares held on extremely well notwithstanding the generally ragged condition of the market. The signs all go to show that the market is on the eve of a long-continued general boom—but, general boom or not, holders of Consolidated are quite sure to see a sharp advance in that specialty before Easter.

Brooklyn Union is dull and strong. The proprietors of this Company are surely expending large sums in its development. Peoples, of Chicago, is about 2 points up from last week, and Lacledes show no change.

## Gas Stocks.

**Quotations by George W. Close, Broker and Dealer in Gas Stocks.**

115 BROADWAY, NEW YORK CITY.

MARCH 13.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

| *N. Y. City Companies.* | *Capital.* | *Par.* | *Bid.* | *Asked* |
|---|---|---|---|---|
| Consolidated Gas Co. | $78,177,000 | 100 | 140 | 140¼ |
| Central Union Gas Co.— | | | | |
| 1st 5's, due 1972, J. & J. | 3,000,000 | 1,000 | 102 | 103 |
| Equitable Gas Light Co.— | | | | |
| Con. 5's, due 1932, M. & S. | 1,000,000 | 1,000 | — | 105 |
| Mutual Gas Co. | 3,500,000 | 100 | 155 | 165 |
| New Amsterdam Gas Co.— | | | | |
| 1st Con. 5's, due 1948, J. & J. | 11,000,000 | 1,000 | 100 | 101½ |
| New York & Richmond Gas Co. (Staten Island) | 1,500,000 | 100 | 35 | 50 |
| 1st Mtg. Gold Bds. 5 p. ct. | 1,000,000 | — | 98½ | 100½ |
| New York and East River— | | | | |
| 1st 5's, due 1944, J. & J. | 3,500,000 | 1,000 | 103 | 105 |
| Con. 5's, due 1945, J. & J. | 1,500,000 | — | 100 | 102 |
| Northern Union— | | | | |
| 1st 5's, due 1927, J. & J. | 1,250,000 | 1,000 | 94 | 100 |
| Standard | 5,000,000 | 100 | — | 75 |
| Preferred | 5,000,000 | 100 | 70 | 100 |
| 1st Mtg. 5's, due 1930, M. & N. | 1,500,000 | 1,000 | 100 | 105 |
| The Brooklyn Union | 15,000,000 | 1,000 | 139 | 140½ |
| 1st Con. 5's, due 1948, M. & N. | 15,000,000 | — | 106¾ | 107 |
| Yonkers | 299,650 | 500 | 180 | — |
| *Out-of-Town Companies.* | | | | |
| Bay State | 50,000,000 | 50 | ⅝ | ¾ |
| " Income Bonds | 2,000,000 | 1,000 | — | 75 |
| Binghampton Gas Works | 450,000 | 100 | — | — |
| " 1st Mtg. 5's | 500,000 | 1,000 | 95 | 100 |
| Boston United Gas Co.— | | | | |
| 1st Series S. F. Trust | 7,000,000 | 1,000 | 82 | 85 |
| 2d " " " | 3,000,000 | 1,000 | 47½ | 50 |
| Buffalo City Gas Co. | 5,500,000 | 100 | 5 | 8 |
| Bonds, 5's | 5,250,000 | 1,000 | 50 | 60 |
| Capital, Sacramento | 500,000 | 50 | — | 35 |
| Bonds (6's) | 150,000 | 1,000 | — | — |
| Chicago Gas Co. Guaranteed Gold Bonds | 7,660,000 | 1,000 | 104 | 106¼ |
| Cincinnati Gas and Electric Co. | 29,500,000 | 100 | 92 | 93 |
| Columbus (O.) Gas Co., 1st Mortgage Bonds | 1,500,000 | 1,000 | 96 | 98 |
| Columbus (O.) Gas Lt. & Heating Co. | 1,682,750 | 100 | 90½ | 91 |
| Preferred | 3,026,500 | 100 | 75½ | 80 |
| Consumers, Toronto | 2,000,000 | 50 | 200 | 204 |
| Consolidated, Baltimore | 11,000,000 | 100 | 106½ | — |
| Mortgages, 6's | 3,000,000 | | 89 | 160 |
| Chesapeake, 1st 6's | 1,000,000 | — | — | — |
| Equitable, 1st 6's | 910,000 | — | — | — |
| Consolidated, 1st 5's | 1,490,000 | — | — | 112 |
| Consolidated Gas Co. of N. J. | 1,000,000 | 100 | 15 | — |
| Con. Mtg. 5's | 976,000 | 1,000 | 92 | 95 |
| Bonds | 75,000 | — | — | 100 |
| Denver Gas and Electric | 3,500,000 | — | 102 | 105 |
| Detroit City Gas Co. | 6,580,000 | — | — | 50 |
| " Prior Lien 5's | 5,619,000 | 1,000 | 97 | 100½ |
| Detroit Gas Co., 5's | 381,000 | 1,000 | 75 | 80 |
| Equitable Gas & Fuel Co., Chicago, Bonds | 2,000,000 | 1,000 | — | 101 |
| Essex and Hudson Gas Co. | 6,500,000 | — | 39 | 40 |
| Fort Wayne | 2,000,000 | — | — | — |
| " Bonds | 2,000,000 | — | 55 | — |
| Grand Rapids Gas Light Co., 1st Mtg. 5's | 1,350,000 | 1,000 | 100 | 101 |
| Hartford | 750,000 | 25 | 190 | 200 |
| Hudson County Gas Co., of New Jersey | 10,500,000 | — | 112 | 113½ |
| " Bonds, 5's | 10,500,000 | — | 108 | 108½ |
| Indianapolis | 2,000,000 | — | 78 | 83 |
| " Bonds, 5's | 2,650,000 | — | 104½ | 105 |
| Jackson Gas Co. | 250,000 | 50 | 82 | — |
| " 1st Mtg. 5's | 200,000 | 1,000 | 97 | 100 |
| Kansas City Gas Light Co., of Missouri | 5,000,000 | 100 | — | 36 |
| Bonds, 1st 5's | 3,822,000 | 1,000 | 102 | 104 |
| Laclede Gas Co., St. Louis. | 10,000,000 | 100 | 110½ | 110¾ |
| Preferred | 2,500,000 | 100 | 91½ | 102 |
| Bonds | 10,000,000 | 1,000 | 102½ | 103 |
| Lafayette Gas Co., Ind. | 1,000,000 | 100 | — | 60 |
| Bonds | 1,000,000 | 1,000 | 60 | 65 |
| Louisville | 2,370,000 | 50 | 143 | 145 |
| Madison Gas and Electric Co. | | | | |
| " 1st Mtg. 6's | 400,000 | 1,000 | 106 | 108½ |
| Massachusetts Gas Companies, of Boston | 25,000,000 | 100 | 92¾ | 93 |
| Preferred | 25,000,000 | 100 | 96½ | 97 |
| Montreal Gas Co., Canada | 2,000,000 | 100 | 218 | 218½ |
| Nashville Gas Light Co. | 1,000,000 | 100 | 110 | — |
| Newark, N. J., Con. Gas Co. | 6,000,000 | — | 56 | 58 |
| Bonds, 6's | 6,000,000 | — | 137 | 138 |
| New Haven Gas Co. | 2,000,000 | 25 | 200 | — |
| Peoples Gas Lt. & Coke Co., Chicago | 25,000,000 | 100 | 105¼ | 105½ |
| 1st Mortgage | 20,100,000 | 1,000 | — | — |
| 2d " | 2,500,000 | 1,000 | 104 | — |
| Rochester Gas & Electric Co. | 2,150,000 | 50 | 88 | — |
| Preferred | 2,150,000 | 50 | 118 | — |
| Consolidated 5's | 2,000,000 | — | 104½ | 105½ |
| San Francisco Gas Co., Cal. | 15,500,000 | — | — | — |
| St. Joseph Gas Co.— | | | | |
| 1st Mtg. 5's | 1,000,000 | 1,000 | 100 | 102 |
| St. Paul Gas Light Co. | 2,500,000 | 100 | — | — |
| 1st Mortgages, 6's | 650,000 | 1,000 | 113 | 116 |
| Extension, 6's | 600,000 | 1,000 | 112½ | 115 |
| General Mortgage, 5's | 3,447,000 | 1,000 | 90 | 95 |
| Syracuse Gas Co., N. Y. | 1,975,000 | 100 | 50 | 55 |
| Bonds | 2,047,000 | 1,000 | 100 | 104 |
| Washington (D. C.) Gas Co. | 1,600,000 | 200 | 399 | 400 |
| 1st Mortgage, 6's | 600,000 | — | — | — |
| Western Gas Co., Milwaukee | 4,000,000 | — | — | — |
| Wilmington (Del.) Gas Co. | 600,000 | 50 | 361 | — |

## Advertisers' Index.

*New advertising, or changes in standing ads., to assure attention the issue following their reception, must be in hand on Wednesday.*

**AMMONIA CONCENTRATORS.**
Bartlett-Hayward Co., Baltimore, Md. ... 537
Fred Bredel Co., Milwaukee, Wis. ... 539
Michigan Ammonia Works, Detroit, Mich. ... 513
The Gas Machinery Co., Cleveland, O. ... 528
Western Gas Construction Co., Fort Wayne, Ind. ... 544

**BURNERS.**
Wm. M. Crane Co., New York City ... 520

**CEMENTS, CONCRETES AND PAINTS.**
Atlas Paint Co., Nashville, Tenn. ... 516
C. L. Gerould, New Castle, Pa. ... 532
Ernst Strassburger, Chicago, Ills. ... 532
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 522

**CHARGING BARROWS & COAL WAGONS.**
Davis & Farnum Mfg. Co., Waltham, Mass. ... 536
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 534
The Stacey Mfg. Co., Cincinnati, O. ... 539

**COKE CRUSHERS.**
Bartlett-Hayward Co., Baltimore, Md. ... 537
C. M. Keller, Columbus, Ind. ... 535

**CONVEYORS—ALL KINDS.**
Bartlett-Hayward Co., Baltimore, Md. ... 537
Brown Hoisting Machinery Co., Cleveland, O. ... 529
Cruse-Kemper Co., Ambler, Pa. ... 524
C. W. Hunt Company, New York City ... 522
Fred Bredel Co., Milwaukee, Wis. ... 539
G. A. Bronder, New York City ... 533
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 534
The Gas Machinery Co., Cleveland, O. ... 528
The Stacey Mfg. Co., Cincinnati, O. ... 539
Western Gas Construction Co., Fort Wayne, Ind. ... 544

**EXHAUSTERS.**
Connelly Iron Sponge & Governor Co., New York City 533
Connersville Blower Company, Connersville, Ind. ... 518
Davis & Farnum Mfg. Co., Waltham, Mass. ... 536
Isbell-Porter Company, Newark, N. J. ... 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 534
Piqua Blower Co., Piqua, O. ... 526
The Gas Machinery Co., Cleveland, O. ... 528
The P. H. & F. M. Roots Co., Connersville, Ind. ... 527

**GAS AND WATER PIPES.**
Davis & Farnum Mfg. Co., Waltham, Mass. ... 536
Donaldson Iron Co., Emaus, Pa. ... 535
R. D. Wood & Co., Philadelphia, Pa. ... 540

**GAS BLAST FURNACES.**
American Gas Furnace Co., New York City ... 530

**GAS COALS.**
Berwind-White Coal Mining Co., New York and Phila. 534
Westmoreland Gas Coal Co., Philadelphia, Pa. ... 535

**GAS COCKS.**
H. Mueller Manufacturing Co., Decatur, Ills. ... 529

**GAS ENGINEERS.**
Bartlett-Hayward Co., Baltimore, Md. ... 537
Chamber Oven Co., Cincinnati, O. ... 539
Charles F. Leonard, New York City ... 514
Cruse-Kemper Co., Ambler, Pa. ... 524
Davis & Farnum Mfg. Co., Waltham, Mass. ... 536
Drakes Limited, Halifax, England ... 527
E. E. Witherby Co., New York City ... 515
Frank D. Moses, Trenton, N. J. ... 480
Fred Bredel Co., Milwaukee, Wis. ... 539
Frederick J. Mayer, New York City ... 538
Glenn Marston, New York City ... 513
Henry I. Lea, Chicago, Ills. ... 515
H. M. Byllesby & Co., Chicago, Ills. ... 515
H. Thurston Owens, New York City ... 513
Humphreys & Glasgow, New York City ... 515
Improved Equipment Company, New York City ... 517
Isbell-Porter Co., Newark, N. J. ... 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 534
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 522
Light, Heat and Power Corporation, Boston, Mass. ... 513
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 532
Quintard Iron Works, New York City ... 525
R. D. Wood & Co., Philadelphia, Pa. ... 540
The Gas Machinery Co., Cleveland, O. ... 528
The Stacey Mfg. Co., Cincinnati, O. ... 539
The United Gas Improvement Co., Philadelphia, Pa. ... 531
Western Gas Construction Co., Fort Wayne, Ind. ... 544
William A. Baehr, Chicago, Ills. ... 529
William W. Randolph, New York City ... 529

**GAS ENRICHERS.**
Standard Oil Co., New York City ... 536

**GAS GAUGES.**
The Bristol Co., Waterbury, Conn. ... 525

**GAS GOVERNORS.**
Chaplin-Fulton Mfg. Co., Pittsburg, Pa. ... 533
Connelly Iron Sponge & Governor Co., New York City. 533
Isbell-Porter Co., Newark, N. J. ... 523
Pittsburg Meter Co., East Pittsburg, Pa. ... 540
Reynolds Gas Regulator Co., Anderson, Ind. ... 532
The Gas Machinery Co., Cleveland, O. ... 528

### GASHOLDERS.
Bartlett-Hayward Co., Baltimore, Md. 537
Chicago Bridge and Iron Works, Chicago, Ills. 518
Cruse-Kemper Co., Ambler, Pa. 524
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Deily & Fowler Mfg. Co., Philadelphia, Pa. 535
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
R. D. Wood & Co., Philadelphia, Pa. 540
Riter-Conley Mfg. Co., Pittsburgh, Pa. 526
The Stacey Mfg. Co., Cincinnati, O. 539
Western Gas Construction Co., Fort Wayne, Ind. 544

### GAS MAIN STOPPERS.
Safety Gas Main Stopper Co., New York City. 535

### GAS METER CONNECTIONS.
H. Mueller Manufacturing Co., Decatur, Ills. 529

### GAS METERS.
American Meter Co., New York and Philadelphia. 543
D. McDonald & Co., Albany, N. Y. 541
Helme & McIlhenny, Philadelphia, Pa. 543
John J. Griffin & Co., Philadelphia, Pa. 496
Keystone Meter Co., Boyersford, Pa. 542
Maryland Meter and Mfg. Co., Baltimore, Md. 542
Metric Metal Works, Erie, Pa. 540
Nathaniel Tufts Meter Co., Boston, Mass. 542
New York Improved Meter Co., New York City. 540
Pittsburg Meter Co., East Pittsburg, Pa. 540
Rotary Meter Co., New York City. 541
Sprague Meter Co., Bridgeport, Conn. 541
Standard Meter Co., Philadelphia, Pa. 542

### GAS PLANT TOOLS.
H. Mueller Manufacturing Co., Decatur, Ills. 529

### GAS STOVES.
American Meter Co., New York and Philadelphia. 543
Keystone Meter Co., Boyersford, Pa. 542
Maryland Meter & Manufacturing Co., Baltimore, Md. 542
Nathaniel Tufts Meter Co., Boston, Mass. 542
Wm. M. Crane Co., New York City. 520

### GAS TAPPING MACHINES.
George Light, Dayton, O. 535
H. Mueller Manufacturing Co., Decatur, Ills. 529

### GAS WORKS APPARATUS AND CONSTRUCTION.
Bartlett-Hayward Co., Baltimore, Md. 537
Connelly Iron Sponge & Governor New Co., York City. 533
Cruse-Kemper Co., Ambler, Pa. 524
C. W. Hunt Company, New York City. 522
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Deily & Fowler Mfg. Co., Philadelphia, Pa. 536
Fred Bredel Co., Milwaukee, Wis. 539
Gas Engineering Co., Trenton, N. J. 480
Humphreys & Glasgow, New York City. 515
Improved Equipment Company, New York City. 517
Isbell-Porter Co., New York City. 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
Laclede-Christy Clay Products Co., St. Louis, Mo. 522
Lloyd Construction Co., Detroit, Mich. 535
Quintard Iron Works Co., New York City. 525
R. D. Wood & Co., Philadelphia, Pa. 540
Riter-Conley Mfg. Co., Pittsburgh, Pa. 526
The Gas Machinery Co., Cleveland, O. 528
The Stacey Mfg. Co., Cincinnati, O. 539
The United Gas Improvement Co., Philadelphia, Pa. 531
Western Gas Construction Co., Fort Wayne, Ind. 544

### HIGH PRESSURE GAS GOODS.
H. Mueller Manufacturing Co., Decatur, Ills. 529

### HOT WATER HEATERS.
Humphrey Co., Kalamazoo, Mich. 520

### GAS LAMPS
American Gas Light Co., Kalamazoo, Mich. 521
General Gas Light Co., Kalamazoo, Mich. 521
Welsbach Company, Gloucester, N. J. 520

### INCLINED RETORTS.
Baltimore Retort and Firebrick Co., Baltimore, Md. 532
Didier-March Co., New York City 538
Fred Bredel Co., Milwaukee, Wis. 539
Gas Bench Construction Co., St. Louis, Mo. 518
Improved Equipment Company, New York City. 517
Laclede-Christy Clay Products Co., St. Louis, Mo. 522
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 532

### LAMP POSTS.
Morris Iron Co., New York City. 515
Thos. T. W. Miner, New York City. 520

### MAIN AND SERVICE LAYING.
Sullivan Bros., Flushing, N. Y. 535

### PATENTS, TRADE-MARKS & COPYRIGHTS
Royal E. Burnham, Washington, D. C. 514

### PIPE LINE TOOLS.
H. Mueller Manufacturing Co., Decatur, Ills. 529

### PREPAYMENT METER ATTACHMENTS.
New York Improved Meter Co., New York City. 540

### PREPAYMENT METERS.
American Meter Co., New York and Philadelphia. 543
D. McDonald & Co., Albany, N. Y. 541
Helme & McIlhenny, Philadelphia, Pa. 543
John J. Griffin & Co., Philadelphia, Pa. 496
Keystone Meter Co., Boyersford, Pa. 542
Nathaniel Tufts Meter Co., Boston, Mass. 542
New York Improved Meter Co. New York City. 540
Pittsburg Meter Co., East Pittsburg, Pa. 540
Sprague Meter Co., Bridgeport, Conn. 541

### PROCESSES.
Bartlett-Hayward Co., Baltimore, Md. 537
Fred Bredel Co., Milwaukee, Wis. 539
Humphreys & Glasgow, New York City. 515
Improved Equipment Company, New York City. 517
The Gas Machinery Co., Cleveland, O. 528
The United Gas Improvement Co., Philadelphia, Pa. 531
Western Gas Construction Co., Fort Wayne, Ind. 544

### PRODUCER POWER PLANTS.
Improved Equipment Company, New York City. 517
R. D. Wood & Co., Philadelphia, Pa. 540

### PURIFIER AND SCRUBBER TRAYS.
Bartlett-Hayward Co., Baltimore, Md. 537
Cabot Mfg. Co., Hoboken, N. J. 535
The Gas Machinery Co., Cleveland, O. 528
Western Gas Construction Co., Fort Wayne, Ind. 544

### PURIFIERS.
Bartlett-Hayward & Co., Baltimore, Md. 537
Connelly Iron Sponge & Governor Co., New York City. 533
Cruse-Kemper Co., Ambler, Pa. 524
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Isbell-Porter Co., Newark, N. J. 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
Quintard Iron Works, New York City. 525
R. D. Wood & Co., Philadelphia, Pa. 540
The Gas Machinery Co., Cleveland, O. 528
The Stacey Mfg. Co., Cincinnati, O 539
The United Gas Improvement Co., Philadelphia, Pa. 531
Western Gas Construction Co., Fort Wayne, Ind. 544

### PURIFYING MATERIALS.
Connelly Iron Sponge & Governor Co., New York City 533
The United Gas Improvement Co., Philadelphia, Pa. 531

### PYROMETERS.
Brown Instrument Co., Philedelphia, Pa. 535

### REGENERATIVE FURNACES.
Baltimore Retort and Firebrick Co., Baltimore, Md. 532
Bartlett, Hayward & Co., Baltimore, Md. 537
Didier-March Co., New York City. 538
Fred Bredel Co., Milwaukee, Wis. 539
Gas Bench Construction Co., St. Louis, Mo. 518
Improved Equipment Company, New York City. 517
J. H. Gautier & Co., Jersey City, N. J. 532
Laclede-Christy Clay Products Co., St. Louis, Mo. 522
Missouri Firebrick Co., St. Louis, Mo. 532
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 532

### RETORTS AND FIREBRICKS.
Baltimore Retort and Firebrick Co., Baltimore, Md. 532
Didier-March Co., New York City. 538
Fred Bredel Co., Milwaukee, Wis. 539
Gas Bench Construction Co., St. Louis, Mo. 518
Henry Maurer & Son, New York City. 525
Improved Equipment Company, New York City. 517
James Gardner, Jr., Co., Bolivar, Pa. 536
J. H. Gautier & Co., Jersey City, N. J. 532
Laclede-Christy Clay Products Co., St. Louis, Mo. 522
Missouri Firebrick Co., St. Louis, Mo. 532
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 532

### RUBBER GOODS.
New York Rubber Co., New York City. 536

### SCRUBBERS AND CONDENSERS.
Bartlett-Hayward Co., Baltimore, Md. 537
Cruse-Kemper Co., Amler, Pa. 524
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Fred Bredel Co., Milwaukee, Wis. 939
Isbell-Porter Co., Newark, N. J. 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
Quintard Iron Works, New York City. 525
R. D. Wood & Co., Philadelphia, Pa. 540
Riter-Conley Mfg. Co., Pittsburgh, Pa. 526
The Gas Machinery Co., Cleveland, O. 528
The Stacey Mfg. Co., Cincinnati, O. 539
The United Gas Improvement Co., Philadelphia, Pa. 531
Western Gas Construction Co., Fort Wayne, Ind. 544

### SELF-SEALING MOUTHPIECE DOORS.
Bartlett-Hayward Co., Baltimore, Md. 537
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Fred Bredel Co., Milwaukee, Wis. 549
Isbell-Porter Co., Newark, N. J. 523
Improved Equipment Company, New York City. 517
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 532
Quintard Iron Works, New York City. 525
R. D. Wood & Co., Philadelphia, Pa. 540
The Gas Machinery Co., Cleveland, O. 528
The Stacey Mfg. Co., Cincinnati, O. 539
Western Gas Construction Co., Fort Wayne, Ind. 544

### STOKING MACHINERY.
Fred Bredel Co., Milwaukee, Wis. 539
G. A. Bronder, New York City. 533
Laclede-Christy Clay Products Co., St. Louis, Mo. 522
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 532

### STORAGE TANKS.
Bartlett-Hayward Co., Baltimore, Md. 537
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Quintard Iron Works, New York City. 525
The Stacey Mfg. Co., Cincinnati, O. 539
Western Gas Construction Co., Fort Wayne, Ind. 544

### STREET LAMPS.
Thos. T. W. Miner, New York City. 520
Welsbach Street Lighting Co., New York and Phila. 530

### TAR AND CARBONIC ACID EXTRACTOR.
Bartlett-Hayward Co., Baltimore, Md. 537
Fred Bredel Co., Milwaukee, Wis. 549
Isbell-Porter Co., Newark, N. J. 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
The Gas Machinery Co., Cleveland, O. 528
The Stacey Mfg. Co., Cincinnati, O. 539
The United Gas Improvement Co., Philadelphia, Pa. 531
Western Gas Construction Co., Fort Wayne, Ind. 544

### VALVES.
Bartlett-Hayward & Co., Baltimore, Md. 537
C. W. Hunt Company, New York City. 522
Davis & Farnum Mfg. Co., Waltham, Mass. 536
Isbell-Porter Co., Newark, N. J. 523
Kerr Murray Mfg. Co., Fort Wayne, Ind. 534
Ludlow Valve Manufacturing Co., Troy, N. Y. 525
R. D. Wood & Co., Philadelphia, Pa. 540
The Gas Machinery Co., Cleveland, O. 528
The P. H. & F. M. Roots Co., Connersville, Ind. 537
The Stacey Mfg. Co., Cincinnati, O. 539
Western Gas Construction Co., Fort Wayne, Ind. 544

### VERTICAL S'S.
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 537
Didier-March Co., New York City. 538
Fred Bredel Co., Milwaukee, Wis. 539
Gas Bench Construction Co., St. Louis, Mo. 518
Improved Equipment Company, New York City. 517
Laclede-Christy Clay Products Co., St. Louis, Mo. 522
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 532

### WATER METERS.
Pittsburg Meter Co., East Pittsburg, Pa. 540

**Utilize Your Gas Liquor.**
NO EXTRA LABOR OR OPERATING EXPENSES.
IMPROVED AMMONIA CONCENTRATOR.
About 130 in use. Write to
STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

H. Thurston Owens,
CONSULTING ENGINEER,
LIGHT, HEAT AND VENTILATION,
1147 Broadway,
NEW YORK CITY.

The Light, Heat & Power Corporation, Boston
CONTRACTING ENGINEER
Electric Light and High Pressure Gas Plants. Equipment, Material and Supplies.
131 State Street, Boston, Mass.
Cable Address, "LIHEPOWCO." Code, LIEBERS'.

GLENN MARSTON,
NEW YORK CITY.
MUNICIPAL STATISTICS.
Information for New Business and Commercial and Municipal Ownership Campaigns. :: :: :: :: ::
CIVIC AND BUSINESS MEN'S ORGANIZATIONS PERFECTED.

# IMPORTANT NOTICE.

**The attention of the trade is called to the fact that U. S. Patent No. 978,127, Dated December 6, 1910, has been issued to us for our Vulcan Odorless or Red Cone Heater.**

**We are prepared to maintain our rights under this patent, and have engaged counsel to sue infringers wherever found.**

**WILLIAM M. CRANE COMPANY,**
**16 WEST 32D STREET, NEW YORK CITY.**

## Position Wanted

**As Chief Clerk or Manager of New Business Department,**

By a young man with 8 years' practical experience in combination companies. Very best of references.

1866-1 Address, "N. B. S.," care this Journal.

## Position Wanted

**As Superintendent or Manager of a Water Gas Company,**

By a progressive and up-to-date gas man, with 12 years' experience in all departments of the gas business.

Address, "SUPERB," Care this Journal.

1865-2

## WANTED,

**Position by a First-Class Fitter and Complaint Man.**

Can also do street work.

1865-1 Address, "R.," care this Journal.

## Position Wanted

**As Superintendent of Water Gas Plant in Town of about 12,000,**

By a young man, age 24, at present employed in same capacity, but desires change of location. Experienced in all branches and not afraid of work.

1866-1 Address, "MARCH," care this Journal.

## Wanted, Position

**By Young Man as Working Manager of Small Company.**

Understands water gas manufacture and distribution, and not afraid of work. Twelve years' references.

1866-2 Address, "ABBOTT," care this Journal.

## Wanted, Position

**As Superintendent of Operation with Parent Company Operating String of Small Plants.**

Coal gas preferred. Twenty years' experience in construction, reconstruction and operating. Warrant results.

1866-1 Address, "O.," care this Journal.

## WANTED.

A large gas and electric light company wants three mechanical engineers and one water gas maker. Good opportunities for advancement for right men.

Address, "CADET," Care this Journal.

1865-tf

## WANTED,

**Experienced Draftsman as Assistant.**

Must be acquainted with coal gas plant construction in all its different branches. Steady employment for the right man. State experience, age, and give references and salary wanted. Answer by letter to

1864-4 W. G. RUDD, 3330 Crystal St., Chicago, Ills.

**STANDARD REDUCTION FACTORS for GASES,**
By Helon Brooks MacFarland, B.S., M.M.E.
**Price, $1.50.** *For Sale by*
**A. M. Callender & Co., 42 Pine St., New York City.**

## WANTED,

**Superintendent,**

Familiar with coal gas manufacture and distribution.

Address, "T. H. M.," Care this Journal.

1866-3

## WANTED,

**Two Good, Hustling Solicitors,**

To work along the North Shore. Apply to representative of the NORTH SHORE CONSOLIDATED GAS COMPANY, Auditorium Hotel, at Illinois Gas Association Convention, Chicago, or Waukegan, Ills., by letter.

1866-1

## WANTED.

**First-Class, Experienced Gas Salesman.**

Liberal salary, or salary and commission. Only first-class, experienced salesman, with proven record, need apply. Good territory. Address,

CITIZENS LIGHT AND FUEL COMPANY,
1866 2 WASHINGTON, IND.

## WANTED,

**Superintendent**

Of electric plant, who is familiar with generating details, and to work up power prospects.

Address, "W. S.," Care this Journal.

1866-3

## WANTED,

**An Experienced Water Gas Maker.**

A sober, steady, married man, who can get results. State age, experience, references and salary required.

Address, "WATER GAS MAKER," Care this Journal.

1866-2

## Great Opportunity

FOR

## YOUNG MEN.

A large company requires the services of several intelligent and conscientious young men, with technical training and 1 or 2 years' experience in general gas manufacture.

Address, "EMPLOYER,"

1866-tf Care this Journal.

**COX'S LOW PRESSURE COMPUTER, $2.50**
**COX'S HIGH PRESSURE COMPUTER, 5.00**

For Sale by American Gas Light Journal, 42 Pine St.

## WANTED,

**Superintendent,**

Combined coal gas and electric plant; also distribution of both.

Address, "R. L. D.," Care this Journal.

1866-3

## WANTED,

**Four or Five-Foot Water Gas Machine,**

By gas company in Middle West. State condition and price. Lowe type preferred.

Address, "SPRUCE," Care this Journal.

1864-3

## FOR SALE,

**Gas Plant in Prosperous Western City, 8,000 Population.**

Plant in excellent condition. Price, $65,000. Earnings will show 6 per cent. or better on investment. Owners will take bond issue for portion of purchase price. Address, "L. B.,"

1866-2 Care this Journal.

## FOR SALE,

**One 6-Foot United Gas Improvement Water Gas Set,**

Complete, which is sold for the purpose of making room for a larger installation. The set is in perfect working order and prices will be quoted upon application. NEW BEDFORD GAS AND

1864-tf EDISON LIGHT CO., New Bedford, Mass.

## CHARLES F. LEONARD,

**CONSULTING ENGINEER,**

ST. PAUL BUILDING,
220 Broadway,
NEW YORK CITY.

TELEPHONE, - - - CORTLAND, 658.

## PATENTS, TRADE MARKS, COPYRIGHTS.

**ROYAL E. BURNHAM,**

**Solicitor of Patents and Counsellor in Patent Causes.**

**833 Bond Building, Washington, D. C.**

**Send for Pamphlet on Patents.**

MOTION STUDY, by Frank B. Gilbreth.
135 pages. Illustrated. Price, $2.

For Sale by
AMERICAN GAS LIGHT JOURNAL, 42 Pine St., N. Y. City.

**H. M. BYLLESBY & COMPANY**
(INCORPORATED).
GAS ENGINEERS,
DESIGN, CONSTRUCT AND OPERATE
COMPLETE COAL, WATER AND CRUDE OIL GAS PLANTS.
**EXAMINATIONS AND REPORTS.**
218 LA SALLE STREET, CHICAGO.
Oklahoma City, Okla. Mobile, Ala. San Diego, Cal.

**E. E. WITHERBY CO.,**
40 WALL STREET, NEW YORK,
ENGINEERS AND OPERATORS
GAS, ELECTRIC, WATER AND STREET R. R. PROPERTIES.
EXAMINATIONS AND REPORTS. PROPERTIES PURCHASED.

The Attractiveness of Your
**OFFICE**
Will be Greatly Increased when You Install
**POSTS**
As Others Have Done.
SEND FOR BULLETIN 20.
DESIGN 33113. CODE WORD CHOMARY.
**THE MORRIS IRON CO.,**
"THE OUTDOOR LIGHTING SPECIALTY HOUSE,"
91 West Street, - - - - New York City.

ALEX. C. HUMPHREYS, President.
EMILE GUILLAUDEU, Treasurer.
ROBT. O. LUQUEER, Secretary.
HOWARD E. WHITE, General Counsel.
EUROPEAN CORRESPONDENTS,
HUMPHREYS & GLASGOW,
LONDON. — BRUSSELS.
**HUMPHREYS & GLASGOW, INC.,**
**CONSULTING ENGINEERS.**
ADVICE AS TO EXTENSION, MANAGEMENT AND RECONSTRUCTION OF GAS AND ELECTRIC PLANTS.
COMPLETE EXAMINATIONS MADE. PROPERTIES PURCHASED.
CITY INVESTING BUILDING, 165 BROADWAY, NEW YORK.

HENRY I. LEA,
**CONSULTING GAS ENGINEER.**
DESIGN---CONSTRUCTION---MANAGEMENT
OF
GAS PLANTS
FOR
CITY SUPPLY---POWER DEVELOPMENT---INDUSTRIAL HEATING.
EXAMINATIONS AND REPORTS.
1519 PEOPLES GAS BUILDING, CHICAGO, ILLS.

**SEE SPECIAL SUBSCRIPTION OFFER, PAGE 519.**

WE SELL YOU WHAT YOU WANT—NOT WHAT WE THINK YOU WANT

HOLDERS. MACHINES.

PROPERLY PREPARED PRESERVATIVE PAINT

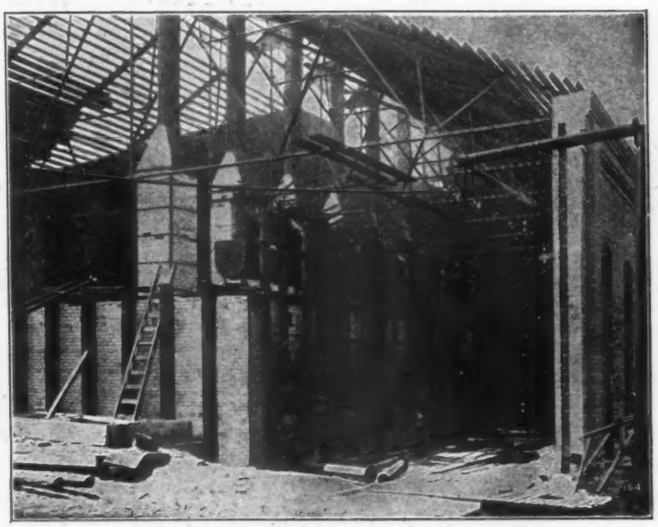
MADE BY A GAS MAN FOR ALL GAS MEN.

THE PAINT THAT WON'T COME OFF ITS BASE

METERS. BUILDINGS.

THE
ATLAS
PAINT CO.,
NASHVILLE, TENNESSEE.
GENERAL MANAGER. . . . . A. S. B. LITTLE.

# STANDARDS OF VALUE



The Completion of a Forty-four Bench Installation.

**MERE PRICE A FALSE STANDARD**

Unless the price asked for a gas bench is the true measure of the value of the bench, that price is a false standard by which to buy.

A merely low price can cover nothing but a cheap construction, of temporary value and limited earning power.

For the things in bench construction which chiefly safeguard the user's interest are very expensively secured by the builder.

A fair price is one which covers a high-class construction throughout, designed for permanency, low up-keep charges, high fuel economy and continued profit earning power.

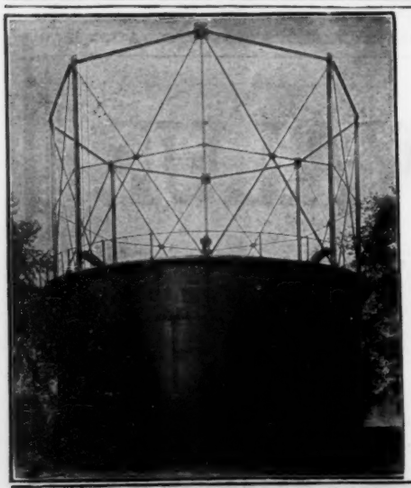
**Doherty Economizer Benches represent maximum value both at the outset and after a period of years.**

# THE IMPROVED EQUIPMENT CO.

**ENGINEERS DESIGNERS BUILDERS**

EXECUTIVE AND SALES OFFICES: 60 Wall Street, NEW YORK.

Sole Agents for the Dessau System of Vertical Retorts for Michigan, Ohio, Kentucky, Tennessee, Mississippi and All States West of These.



# GAS HOLDERS,

WATER TOWERS, STANDPIPES, OIL TANKS, SCRUBBERS, SMOKE STACKS.

**CHICAGO BRIDGE & IRON WORKS.**

Offices, { 105th and Throop Streets, Chicago.
No. 30 Church Street, New York, N. Y.
Praetorian Building, Dallas, Tex.
Greenville, Pa.

Shops, { Chicago, Ill.
Greenville, Pa.

**GAS BENCH CONSTRUCTION CO.,**

ST. LOUIS, MO.

## COAL GAS BENCHES.

**HORIZONTAL.——INCLINED.——VERTICAL.**

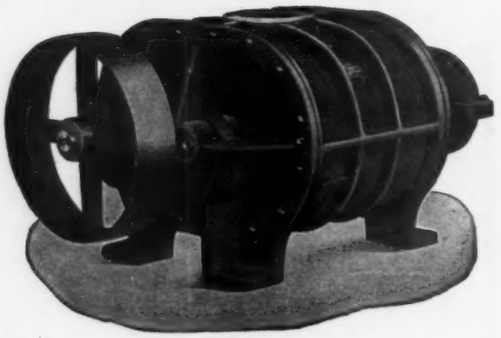
WE HAVE ALL TYPES and SIZES IN SUCCESSFUL OPERATION.
BUILT AFTER OUR OWN DESIGNS and WITH OUR OWN MATERIALS.

WATER GAS LININGS, CHECKERBRICK.

ALL WORKMANSHIP, MATERIAL AND RESULTS GUARANTEED.

## USE CONNERSVILLE VICTOR BLOWERS

With Gas Blast Burners



For Annealling,
Tempering,
Brazing,
Welding,
Enamelling,
Soldering,
Forging,
Assaying,
Refining, Etc.

Ask for a temperature chart showing the melting, tempering and annealling points of different metals. IT'S FREE.

## THE CONNERSVILLE BLOWER COMPANY,

Connersville, Indiana, U. S. A.

NEW YORK OFFICE, 50 Church Street. CHICAGO OFFICE, 536 Monadnock Building.

# SPECIAL SUBSCRIPTION OFFER.

THE AMERICAN GAS LIGHT JOURNAL celebrated its Fiftieth Anniversary on July 1, 1909, and issued a special number, containing articles by the following contributors:

Helen Armstrong,
Arthur. E. Boardman,
Fred. Bredel,
John A. Britton,
Thomas J. Cunningham,
Rufus C. Dawes,
Frederic Egner,
Dr. A. H. Elliott,
Philmer Eves,
W. H. Gartley,
A. F. Ganz,
R. W. Hilgenstock,
Norton H. Humphrys,
C. J. Russell Humphreys,
J. B. Howard,
Frederick J. Mayer,
Carroll Miller,
F. N. Morton,
William E. McKay,
D. McDonald,
H. Thurston Owens,
William H. Pearson,
James D. Perkins,
George G. Ramsdell,
E. P. Reichhelm,
George W. Whyte.

A few copies of this edition can be obtained for $1, or each new subscriber using this blank will receive a copy of the Fiftieth Anniversary number and the JOURNAL for one year.

Subscription Rate for United States and Mexico, $3 per year. Canada, $4. Foreign points, $5.

.....

.....19...

AMERICAN GAS LIGHT JOURNAL,
42 Pine Street, New York City:

Inclosed find order for subscription to the JOURNAL for one year to the following address:

(Name).....

(Address).....

# BRAY BURNERS HAVE BEEN USED FOR MORE THAN FORTY YEARS.

In that time they have been recommended and used by the leading gas experts, endorsed by the U. S. Government Inspectors of Gas, as well prominent State Inspectors.

To-day the Bray is the only high-grade, absolutely reliable open flame burner on the market.

## W. M. CRANE COMPANY,

**16, 18 and 20 West 32d Street, New York,**

**SOLE AGENTS FOR GEO. BRAY & CO., LEEDS, ENGLAND.**

PACIFIC COAST DISTRIBUTORS: Northwest Gas Equipment Company, Portland, Oregon.

NO. 100 LAMP.

## "THE MINER" GLOBE STREET LAMPS.

OVER FORTY YEARS IN USE THE WORLD OVER.

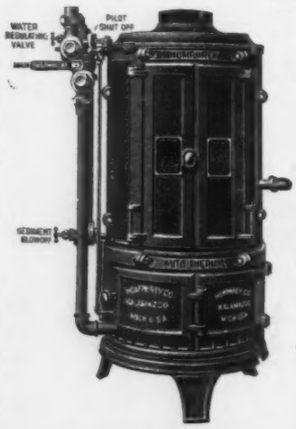
THE BEST STREET LAMPS for ALL KINDS OF GAS OR BURNERS.

This is only one of a Large Variety of Styles.

SEND FOR CATALOGUE.

## THOS. T. W. MINER,

821 and 823 Eagle Avenue, New York.




## ORDER NOW

TO GET PROMPT SHIPMENT.

## HUMPHREY AUTOMATIC GAS WATER HEATERS

Have the valve at the top; easy and cheap to connect; a sootless bunsen flash pilot; a galvanized, rust-proof, non-clogging burner, and many other things making for trouble freedom and high efficiency. ∴ ∴ ∴ ∴

GUARANTEED.

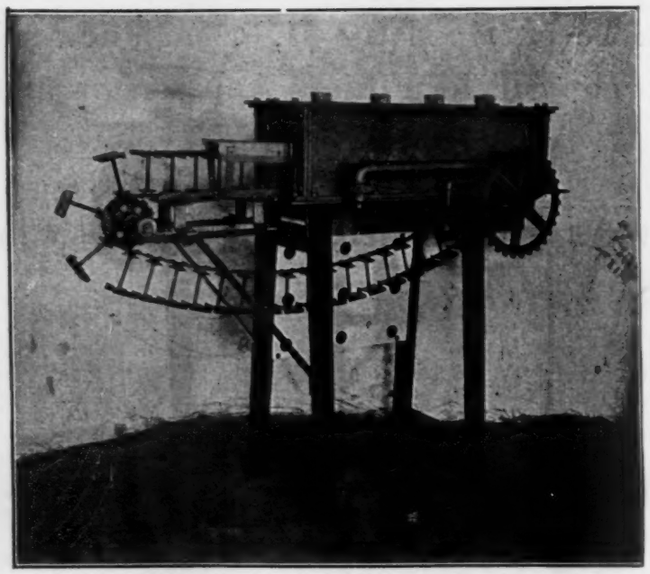
They Make Pleased Users.

## HUMPHREY CO.,

Kalamazoo, Mich.

# GAS FURNACES AND HEATING MACHINES

No. 54 Heating Machine.



This MACHINE recommended for ANNEALING or HARDENING NEEDLES, STEEL PINS and similar work.

"Heating Machines" are Furnaces provided with carriers or propelling machinery for the Continuous Transmission of Work through heated space, for Annealing, Brazing, Hardening and Tempering Quantities.

FOR

## INDUSTRIAL PURPOSES.

A MOST PROFITABLE DEPARTMENT FOR GAS COMPANIES.

## WHAT WE MANUFACTURE:

Pressure Blowers, Heating Machines,
Gas Blast Furnaces, Blow Pipes and Burners.

STATE

AMOUNT - } OF WORK
SIZE - - } to be done in
KIND - - } given time.

## AMERICAN GAS FURNACE COMPANY,

24 John St., New York, N. Y.

CATALOGUE SENT on APPLICATION.

# THE STORE RADIANT!

TIME was when stores at night were dingy, full of shadows, dark nooks and corners---but all that belongs to an age that is past.

This is a **luminous** age!

Once the night gloom of the retail store was dispelled by a few scattered, flickering tallow dips. Later the smoky, explosive kerosene lamp came into general use, and while it was an improvement, the idea of store lighting was still a narrow one---**"something to see by"**---that's all!

The prevailing idea of store lighting to-day is very different---not merely "something to see by," but **illumination**---everything illumined---the store flooded with light---light streaming into every nook and corner---darkness dispelled and the shadows driven out. The ideal store of the present is---THE STORE RADIANT! And the ideal way to make a store radiant is to install Humphrey Inverted Gas Arc Lamps. Their direct rays give you the light of day.

**Humphrey Mantles are Made for Humphrey Lamps, None Better.**

## GENERAL GAS LIGHT CO.,

**Kalamazoo. New York. San Francisco.**

Made in 3 and 4 Burners.

## AMERICAN 1910-A

### INVERTED GAS ARC LAMP.

**YOU WHO ARE LOOKING FOR GOOD THINGS NOTE SOME OF THE EXCEPTIONAL FEATURES OF THIS LAMP.**

The Ventilator is made in two vertical hinged sections which may be easily opened, removed if desired, and locked automatically.

The Valve may be removed for cleaning by loosening ONE set screw and turning a hexagon nut. No Springs to get out of order.

All working parts accessible, removable and interchangeable, even while lamp is in operation.

Each Burner has a Separate Gas Adjustment which may be locked after correct incandescence is obtained.

Mantles are suspended in a Plate which raises and lowers on two guide rods—No Jar—No Warping—Great Saving in Maintenance Costs.

Porcelain Burner Noses are held firmly in position by German Silver Cap.

Best Material, Skilled Workmanship. Every Lamp guaranteed mechanically perfect.

**A LABOR SAVER. A LIGHT GIVER. A PRICE SATISFIER.**

CORRESPONDENCE SOLICITED.

## AMERICAN GAS LIGHT COMPANY,

KALAMAZOO, MICH. BOSTON, MASS. MANCHESTER, ENGLAND.

# Laclede-Christy Clay Products Co.,

**ST. LOUIS, MO.,**

Designers, Manufacturers and Builders of

**HORIZONTAL, INCLINED and VERTICAL**

# GAS BENCHES.

**All Types in Successful Operation.**

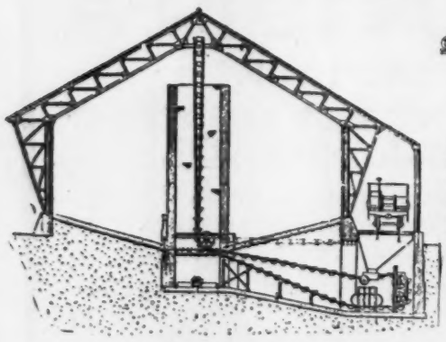
WE MAKE A SPECIALTY OF

## WATER GAS LININGS.

Our Plants are Equipped for Handling the Largest Contracts.
Our Products are Manufactured from Clays Taken from Our Own Mines.



## Hunt Noiseless Bucket Conveyor



Handling coal from railroad cars to Coal Storage pockets and from storage to retort house. The coal can be drawn from the bottom of the pocket into the tunnel conveyor should spontaneous combustion occur. Capacity, 30,000 tons.

SOLE AGENTS FOR THE

## MacDonald-Mann Quenching Chutes.

Our specialty is the economical handling of coal or coke in Gas Works, and our engineers are ready to study your particular case and apply the cheapest and most modern methods. They are at the service of any present or prospective customer. Call on them to solve your problem.

**C. W. Hunt Company,** { Main Office and Works: WEST NEW BRIGHTON, N.Y. [City Limits].

New York City, 45 Broadway. Richmond, Va., State Bank, Bldg. Atlanta, Ga., 807 Rhodes Bldg. Chicago, 1616 Fisher Bldg. San Francisco, 865 Monadnock Bldg.



NOW ON SALE. NEW EDITION IN CLOTH COVERS.

COX'S LOW PRESSURE COMPUTER, - Price, $2.50
COX'S HIGH PRESSURE COMPUTER, - " 5.00

For Sale by AMERICAN GAS LIGHT JOURNAL,
42 Pine Street, New York City.


## PUBLIC LIGHTING TABLE FOR MARCH, 1911.

[Communicated by The American Meter Company.]

| Day of Week. | MOONLIGHT SCHEDULE. | | |
|---|---|---|---|
| | Date. | Light. | Extinguish. |
| Wednesday | 1 | 6.20 P.M. | 5.30 A.M. |
| Thursday | 2 | 6.20 | 5.30 |
| Friday | 3 | 6.20 | 5.30 |
| Saturday | 4 | 6.20 | 5.30 |
| Sunday | 5 | 10.30 | 5.20 |
| Monday | 6 | 11.40 | 5.20 |
| Tuesday | 7 | 1.00 A.M. F.Q. | 5.20 |
| Wednesday | 8 | 2.00 | 5.20 |
| Thursday | 9 | 3.00 | 5.20 |
| Friday | 10 | 3.50 | 5.20 |
| Saturday | 11 | 4.30 | 5.20 |
| Sunday | 12 | 5.00 | 5.20 |
| Monday | 13 | No L. | No L. |
| Tuesday | 14 | No L. F.M. | No L. |
| Wednesday | 15 | No L. | No L. |
| Thursday | 16 | 6.40 P.M. | 9.00 P.M. |
| Friday | 17 | 6.40 | 10.00 |
| Saturday | 18 | 6.40 | 11.10 |
| Sunday | 19 | 6.40 | 12.10 A.M. |
| Monday | 20 | 6.40 | 1.10 |
| Tuesday | 21 | 6.40 | 2.10 |
| Wednesday | 22 | 6.40 L.Q. | 3.00 |
| Thursday | 23 | 6.40 | 3.50 |
| Friday | 24 | 6.40 | 4.40 |
| Saturday | 25 | 6.40 | 5.00 |
| Sunday | 26 | 6.50 | 4.50 |
| Monday | 27 | 6.50 | 4.50 |
| Tuesday | 28 | 6.50 | 4.50 |
| Wednesday | 29 | 6.50 | 4.50 |
| Thursday | 30 | 6.50 N.M. | 4.50 |
| Friday | 31 | 6.50 | 4.50 |

# ISBELL-PORTER COMPANY,

NEWARK, N. J.

FOWLER'S PATENT STAND PIPES FOR MACHINE OPERATED RETORT HOUSES.

BUILD YOUR HORIZONTAL 8'S WITH 8-FOOT ARCHES AND REDUCE THE COST OF SETTINGS AND BUILDING.

CONTRACTORS FOR

**COMPLETE MECHANICALLY-OPERATED RETORT HOUSES.**


## MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

*American Gas Institute.*—Annual meeting, October, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

*Canadian Gas Association.*—Annual meeting, June, 1911. ————. Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

*Empire State Gas and Electric Association.*—Annual meeting, Nov., 1911. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

*Guild of Gas Managers of New England.*—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

*Illinois Gas Association.*—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

*Illuminating Engineering Society.*—Annual meeting, Oct. Chicago, Ill., 1911. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 30 West 39th street. New England, Secretary, W. S. Farrow, 1290 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, G. B. Muth, 1000 Chestnut street Chicago, Secretary, F. H. Bernhard, Marquette Building.

*Indiana Gas Association.*—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

*Iowa District Gas Association.*—Annual meeting, time, June, 1911, ————. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

*Kansas Gas, Water and Electric Light Association.*—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

*Michigan Gas Association*—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

*Missouri Electric Light, Gas, Water Works and Street Railway Association.*—Annual meeting, April 13 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine; Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

*National Commercial Gas Association.*—Annual meeting, December 5-12, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

*Natural Gas Association.*—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O. Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

*New England Gas Association.*—Annual meeting, third Wednesday in February, 1911; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

*Oklahoma Public Utilities Association.*—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

*Pacific Coast Gas Association.*—Annual meeting, Sept. 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice-President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

*Pennsylvania Gas Association.*—Annual meeting, April, 1911, Reading, Pa. Officers: President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

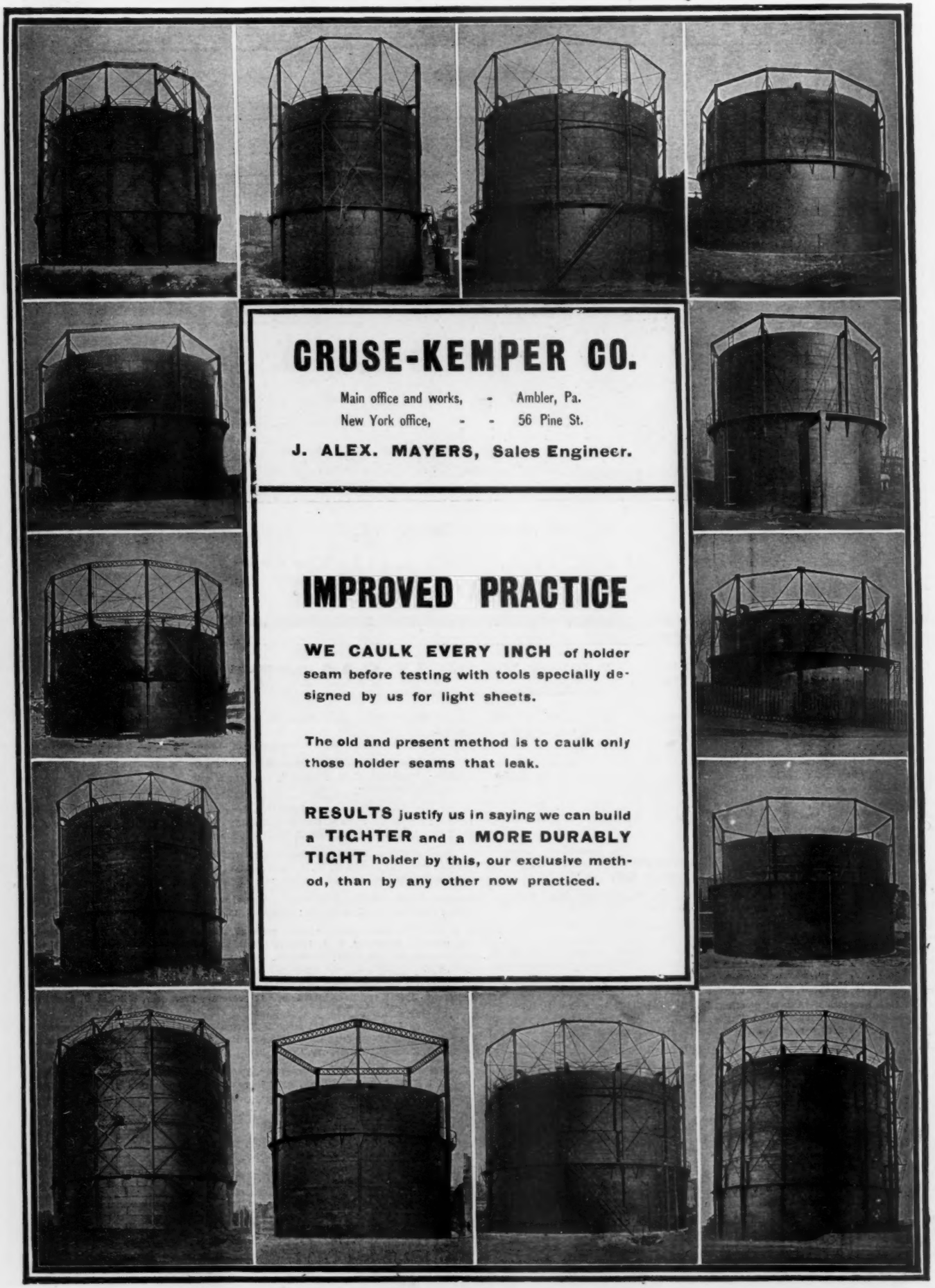
*Society of Gas Lighting.*—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, Waterbury, Conn.

*Southern Gas Association.*—Annual meeting, April 19-21, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

*Southwestern Electrical and Gas Association.*—Annual meeting. April 27, 28, 29, 1911; Houston, Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

*Wisconsin Gas Association.*—Annual meeting, May ————, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.


**Directory of American Gas Companies, 1910.** **Price, $5.00.** For Sale by American Gas Light Journal, 42 Pine St. N. Y. City.



# CRUSE-KEMPER CO.

Main office and works, - Ambler, Pa.
New York office, - - 56 Pine St.

**J. ALEX. MAYERS, Sales Engineer.**

## IMPROVED PRACTICE

**WE CAULK EVERY INCH** of holder seam before testing with tools specially designed by us for light sheets.

The old and present method is to caulk only those holder seams that leak.

**RESULTS** justify us in saying we can build a **TIGHTER** and a **MORE DURABLY TIGHT** holder by this, our exclusive method, than by any other now practiced.

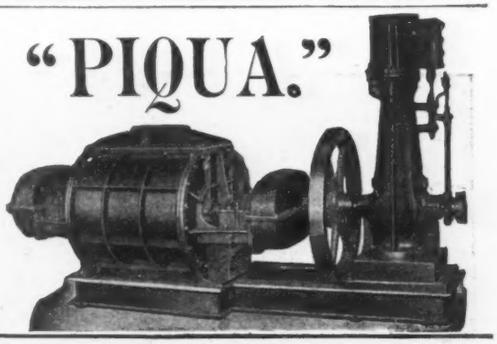
## GAS EXHAUSTERS AND BLOWERS.

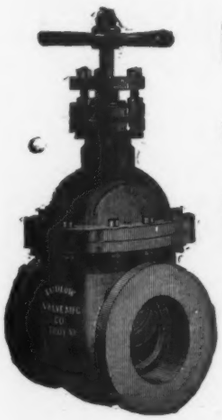
We have a full line of sizes for all standard pressures. The design, material and workmanship is A-1. Prompt Delivery and Reasonable Prices. WHY NOT give us YOUR requirements?

**THE PIQUA BLOWER CO.,**

PIQUA, OHIO.

"PIQUA."





THE

**Ludlow Valve Mfg. Co.,**

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

—FOR—

**Gas, Water, Steam, Oil, Ammonia, Etc.**

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

QUINTARD IRON WORKS CO.,

Foot of Twelfth Street and East River, New York

BENCH WORK,
CONDENSERS,
SHAVING SCRUBBERS,
CAST IRON FLANGED PIPE,
RIVETED STEEL PIPE.

FREDERICK W. FLOYD, Engineer.

ESTABLISHED 1856.

HENRY MAURER & SON,

Manufacturers of

**High Grade Firebrick, Blocks, Tiles,**

ETC.,

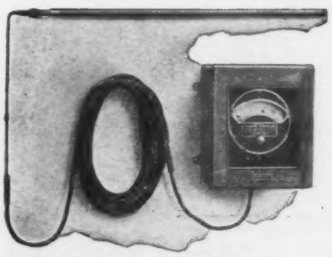
Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City.

LLOYD CONSTRUCTION COMPANY

**GAS APPARATUS.**

DETROIT—MICHIGAN

## THE WM. H. BRISTOL ELECTRIC PYROMETERS.



The accompanying illustration shows a Complete Indicating Pyrometer as recommended for measuring temperatures at the top of Superheater of Water Gas Machine.

Write for new 56-page illustrated catalogue No. 130, with full information about Indicating and Recording outfits of these Pyrometers, including partial list of more than 750 users.

**THE BRISTOL COMPANY, - - - Waterbury, Conn.**

BRANCH OFFICES: NEW YORK. PITTSBURG. CHICAGO.

# PYROMETERS

—FOR—

**WATER GAS APPARATUS.**

**Accurate, Durable, Reliable.**

**BROWN INSTRUMENT COMPANY,**

**PHILADELPHIA, PA.**

Eleven Millions Capacity in One Retort House.

# RITER-CONLEY MFG. COMPANY,

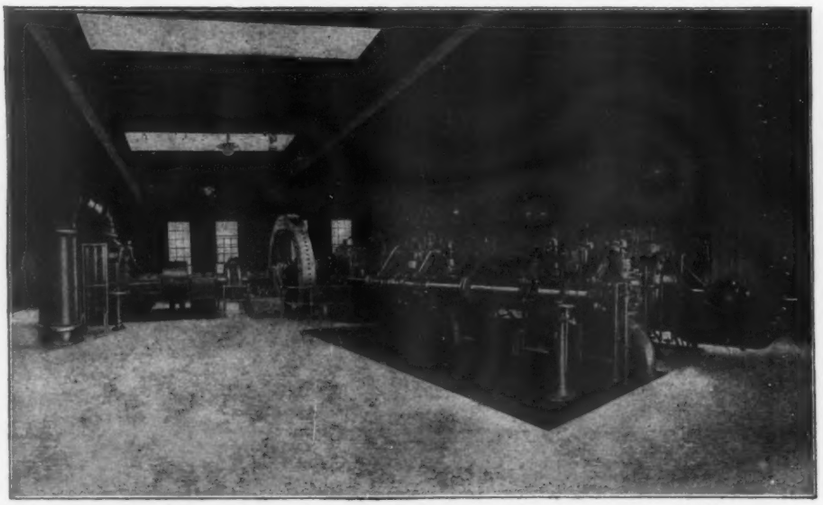
## PITTSBURGH.

## PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

## COMPLETE COAL GAS PLANTS.

# ROOTS' EXHAUSTERS.

A half century of experience, up-to-date engineering and shop facilities embodied in these **World Famous Gas Exhausters.**



**An Installation for the Peoples Gas Light and Coke Co., Chicago, Ill., handling 1,000,000 c. ft. per hour, under six (6) pounds per square inch.**

**P. H. & F. M. ROOTS COMPANY.**

**HOME OFFICE: Connersville, Ind. NEW YORK OFFICE: 120-122 Liberty St. CHICAGO OFFICE: 1547 Marquette Bldg.**

SEND FOR POCKET EDITION OF "ENGINEERS' PRACTICAL REFERENCE BOOK."

# BINDER

FOR THE

# JOURNAL.

**PRICE, $1.**

FOR SALE BY

**A. M. CALLENDER & CO., - 42 Pine St., New York.**

# DRAKES
## LIMITED,
## HALIFAX. ENGLAND.

## GAS ENGINEERS AND CONTRACTORS.

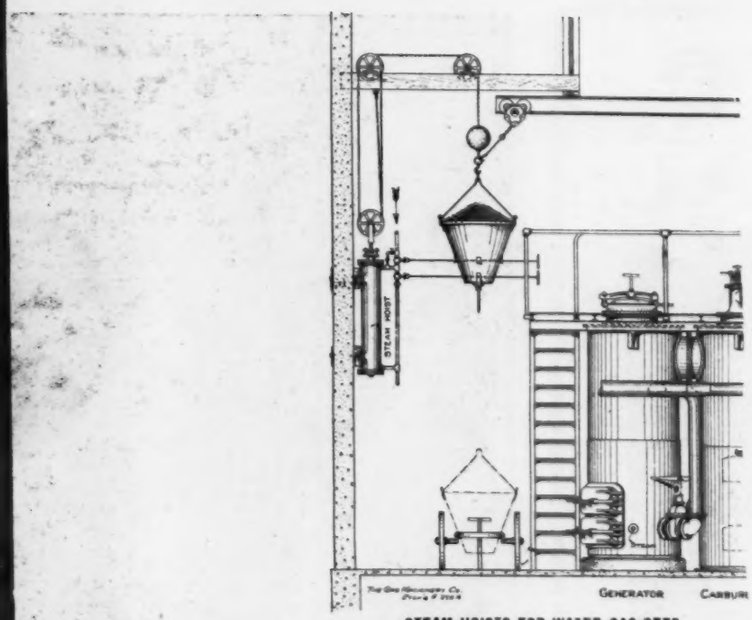
P. PLANTINGA, President W. E. STEINWEDELL, Secretary

THE GAS MACHINERY CO.,

Main Office and Shops

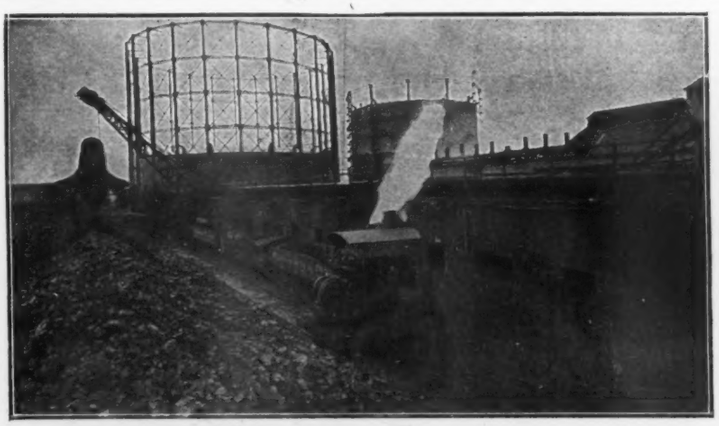
CLEVELAND, OHIO.

COAL AND WATER GAS APPARATUS.
EXHAUSTERS, CONDENSERS, SCRUBBERS,
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS.
BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.




STEAM HOISTS FOR WATER GAS SETS.

THE GAS MACHINERY CO.
CLEVELAND, OHIO.



"BIG SAVING" in your handling account using a "BROWNHOIST" LOCOMOTIVE CRANE AND GRAB BUCKET.

The illustration shows equipment in use at Kalamazoo Gas Co., Kalamazoo, Mich.

**The Brown Hoisting Machinery Company.**

CLEVELAND, O.

**WILLIAM A. BAEHR,**
**CONSULTING ENGINEER,**
PEOPLES GAS BUILDING, CHICAGO.
Also Representing The Bartlett Hayward Company.

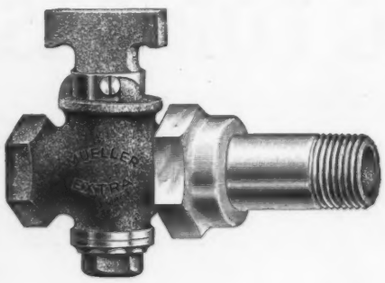
CABLE ADDRESS: WILDOLPH, NEW YORK.

**WILLIAM W. RANDOLPH, M.E.,**
**CONSULTING ENGINEER,**
FORMERLY CHIEF ENGINEER AND VICE-PRESIDENT OF HUMPHREYS & GLASGOW, INC.

165 BROADWAY, NEW YORK CITY.

**EXAMINATION AND VALUATION OF PUBLIC UTILITY AND POWER CORPORATIONS.**
**ADVICE AS TO CONSTRUCTION AND MANAGEMENT.**

TEE HEAD WITH CHECK.
Ball Joint, Union Coupling.

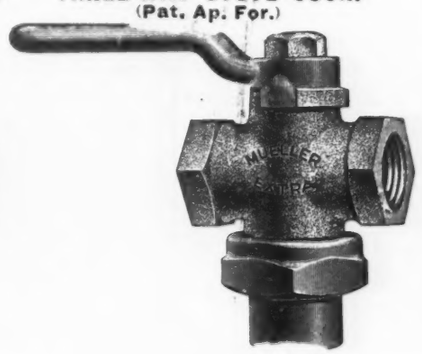


D-15304.

ANGLE PATTERN STOVE COCK.
(Pat. Ap. For.)

D-15897.

THREE-WAY STOVE COCK.
(Pat. Ap. For.)



D-15898.

**The Mueller Line Of Gas Stove Cocks**

Includes six patterns, made in Standard, Extra and Special Straight way, Extra and Oval way, and Standard and Extra Round way, with flat, tee and socket head, with or without check.

The Angle and Three way cocks are made for special purposes, the former for restricted spaces and the latter for use with both natural and artificial gas.

They are Unconditionally Guaranteed.

TRADE MARK MUELLER REGISTERED

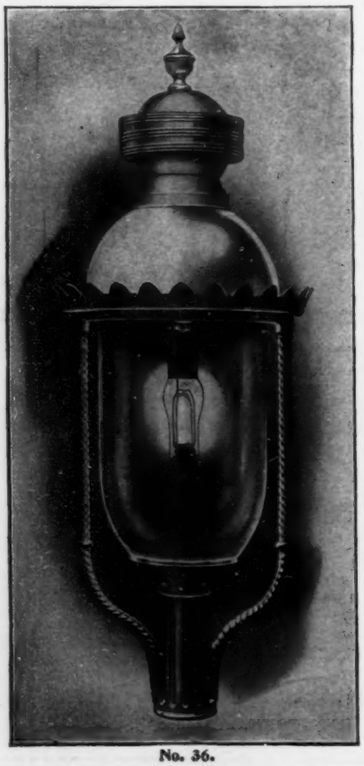
Works and General Offices, DECATUR, ILL., U. S. A. West Cerro Gordo St.

**H. MUELLER MFG. CO.**

Eastern Division, NEW YORK, N. Y., U. S. A. 254 Canal St. (cor. Lafayette).

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Ree Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

# WELSBACH STREET LIGHTING COMPANY



No. 36.

....OF AMERICA....

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

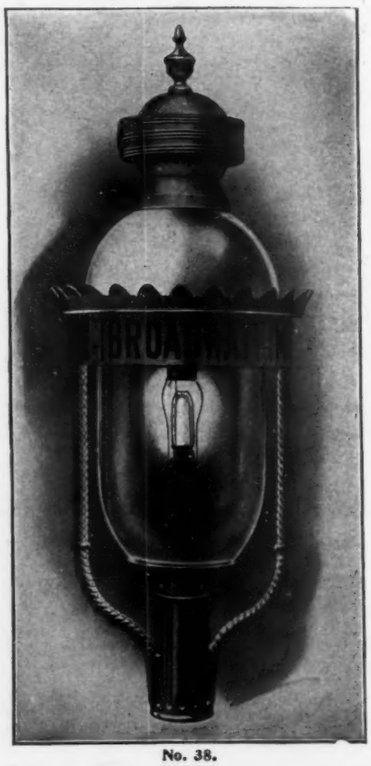
POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.



No. 38.

No. V-571—FLEMISH.

## DRIVE HOME THE IMPORTANCE OF PIPING FOR GAS

to the architects and builders of your town.

You will find that talks on this subject are appreciated by those concerned in the designing and construction of new buildings, especially when they gather together for discussing the various matters pertaining to their business.

Nowadays all progressive business men are more than ready to receive information on subjects so closely connected with their work as modern illumination.

As a result—**more gas will be used in your town!**

Explain the free services which our Illuminating Engineering Laboratories will provide for insuring correct plans for piping and illumination with

REFLEX LAMPS AND REFLEXOLIERS.

*Welsbach Company*

Factories:

Gloucester, N. J.——————Columbus, O.

# THE UNITED GAS IMPROVEMENT COMPANY,

PHILADELPHIA.

## BUILDERS OF

## THE STANDARD DOUBLE SUPERHEATER

## LOWE WATER GAS APPARATUS.

ACCURATE MEASUREMENT

OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { **PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.**

PRODUCING { **UNIFORM RESULTS. HIGHEST EFFICIENCIES.**

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

**J. H. Gautier & Co.**

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

**CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.**

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

**FLEMMING GENERATOR GAS FURNACE**

**GEROULD'S IMPROVED RETORT CEMENT.**

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

*Price List, f.o.b.* NEW CASTLE, PA.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

**C. L. GEROULD,**
29 North Mill St., New Castle, Pa.

RESISTS DECARBONIZATION.

*Best Cement for Patching, Repairing, Glazing Retorts, Making up Bench Work, Etc.*

**KRATER-DINAS RETORT CEMENT.**

In bags of 150 lbs. In barrels of 330 lbs. For particulars and prices apply to

SOLE IMPORTER,
**ERNST STRASSBURGER,**
2630 Lincoln Ave., Chicago, Ills.

**"BEST BY TEST."**

ESTABLISHED 1868.

**BALTIMORE RETORT & FIRE BRICK COMPANY.**

**COAL GAS BENCHES.**

HORIZONTAL RETORTS.
INCLINED RETORTS.
VERTICAL CHAMBERS.

**THE PARKER-RUSSELL MINING AND MFG. CO.,**

**St. Louis, Mo., 500-508 Liggett Bldg. New York Office, 45 Broadway.**

**GAS RETORT BENCHES,** Horizontals, Verticals, Inclines.
Longest Life---Largest Output per Retort---Lowest Fuel Results---Greatest Ease of Operation.
**WATER GAS LININGS.**
**STOKING MACHINES,** FIDDES-ALDRIDGE DISCHARGING CHARGER.
**WOODALL-DUCKHAM,** CONTINUOUS SYSTEM OF VERTICAL RETORTS.
LARGE STOCK OF RETORTS AND SETTINGS ON HAND.
ALL OUR WARES ARE MANUFACTURED AT OUR OWN PLANT FROM CLAYS MINED FROM OUR OWN MINES.
All Contracts Made as of St. Louis. Correspondence Solicited.

JOHN DELL,
*President and General Manager.*

**MISSOURI FIRE BRICK CO.,**

ESTABLISHED 1882.

MANUFACTURERS OF

**Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.**

*We are the* **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One to Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office: *411 Olive Street, Continental Bank,* ST. LOUIS, MO.

**EXPERT INSPECTION** of Holders and Other Structures During Construction.
**ECONOMIC DESIGN** of Steel Structures, Reinforced Concrete, Masonry and Foundations.
FREDERIC DE P. HONE & CO., Engineers, . . . . . 1 Liberty Street, New York City.

12-inch High Pressure Governor.

**REYNOLDS' GAS REGULATOR COMPANY,**

ANDERSON, IND., U. S. A.

We make all sizes for all classes of reduction,

**Double and Single District Stations,**

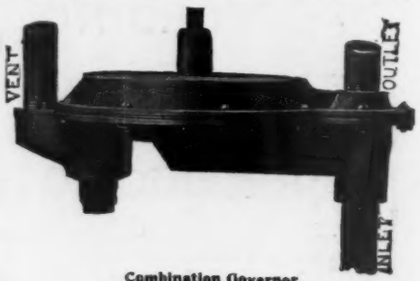
And Individual Service Governors for Reducing High Pressure.

**HOLDER GOVERNORS**

And Low Pressure Regulators, all of the Dry Diaphragm type.

**English Agents:**
THE BRYAN DONKIN CO., LTD., Chesterfield, England.

**Write for Catalog.**




Combination Governor.
(Governor and Mercury Seal.)

# Bronder Patent Stoking Machinery.

**Three-Scoop and Three-Rake Charging and Discharging Machines** are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

**Four-Scoop and Four-Rake Charging and Discharging Machines** are operating in Detroit, Mich., and Cincinnati, Ohio. These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

**Hot Coke Conveyor, Quencher and Steam Exhauster,** operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

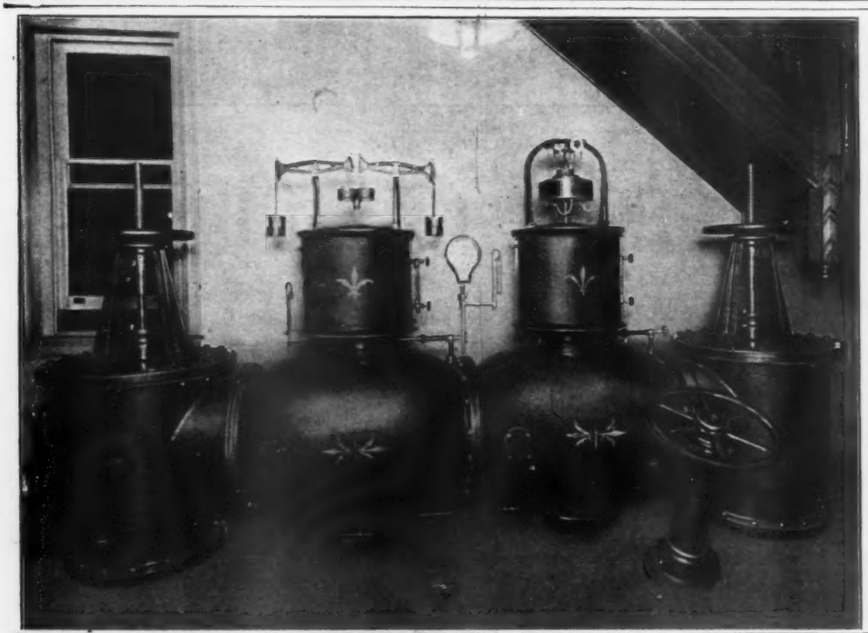
COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

**G. A. BRONDER,**

**Contracting Engineer and Builder,**

229 BROADWAY, NEW YORK.

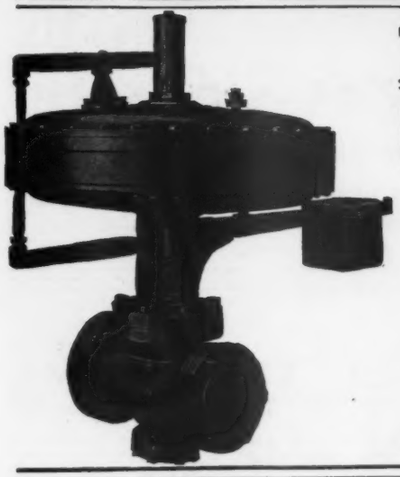


## CONNELLY IRON SPONGE & GOVERNOR COMPANY,

Automatic, Balance, High Pressure Governors,
Service Governors,
Smokeless Tar Burning System,
Exhausters,
Iron Sponge,
Purifying Material,
Revivifying Apparatus,
Unison Telemetric Pressure Gauges,
Photometers,
Tar Extractors and Separators,
Sulphur Testers,
Specific Gravity Testers,
Siphon Pressure Gauges,
Gas Helmets,
First Aid to Injured,
Meter Reading Lamps,
Trouble Lamps,
Gas Lighters,
Thermometers,
Anything Used in the Gas Industry.

127 DUANE ST., - NEW YORK CITY.
1000 WEST 22D ST., - CHICAGO, ILL.

PACIFIC COAST AGENT:
VAN E. BRITTON, SAN FRANCISCO, CAL.



## THE FULTON GAS PRESSURE GOVERNORS

**For Artificial or Natural Gas.**
**For District or Individual Service.**

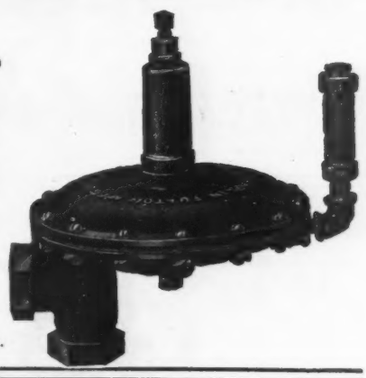
Our Improved **Duplex Sensitive Governor** for district service will reduce high pressure gas to inches of water without variation. Absolutely safe and reliable. No complicated mechanism to get out of order. No auxiliary regulators to assist the main governor required. The most simple and perfect governor ever placed on the market. We also manufacture Reducing Governors for any inlet or outlet pressure.

See our high pressure Service Governor with safety valve and automatic cut-off.

More than 20 years' experience with the largest gas companies. Send for catalog.

THE CHAPLIN-FULTON MFG. CO., {PITTSBURGH, PA.

VAN E. BRITTON, Pacific Coast Agent, Monadnock Bldg., San Francisco, Cal.



## FIELD'S ANALYSIS FOR THE YEAR 1909.

PRICE, $5. FOR SALE BY

**AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.**

## COAL TAR AND AMMONIA,

By GEORGE LUNGE, PH.D. Third and Enlarged Edition.

Price, $15. For Sale by

AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.

## BERWIND-WHITE COAL MINING COMPANY'S

# Ocean Westmoreland Gas Coal.

**Offices:**
Washington Building, New York.
Arcade Building, Philadelphia.

**STRICTLY** High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming.

**A. C. M. AZOY,**
**General Agent and Manager Gas Coal Department,**
**No. 1 Broadway, New York.**

# KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

## APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS
AND STEEL TANKS,

Latest Improved

## ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

**Street Specials and Valves.**

ADDRESS:

**KERR MURRAY MANUFACTURING COMPANY,** {FORT WAYNE, IND.

PRACTICAL HANDBOOK ON

# GAS ENGINES,

With Instructions for Care and Working of the Same,

**By G. LIECKFELD, C.E.**

**Translated with Permission of the Author, GEO. M. RICHMOND, M.E.**

PRICE, $1.00.

**For Sale by**
**AMERICAN GAS LIGHT JOURNAL, 42 Pine Street, New York City.**

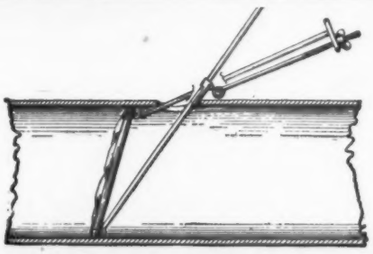
**KELLER ADJUSTABLE COKE CRUSHER.**

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,

Columbus, Ind.

Correspondence Solicited.



**GOODMAN STOPPER**

*The Half Minute*

**GAS MAIN SHUT-OFF**

MANUFACTURED AND SOLD BY

Safety Gas Main Stopper Co.

257-263 E. 133d Street, New York.

AGENTS.

Pacific Coast—VAN E. BRITTON, 269 Monadnock Building, San Francisco, Cal.

Great Britain—PARKER & LESTER, Ormside St., Old Kent Road, London, S. E.

GEORGE ORMROD, Pres. & Treas. JOHN D. ORMROD, Supt. J. G. EBERLEIN, Secretary.

**EMAUS PIPE FOUNDRY.**

DONALDSON IRON COMPANY. EMAUS, PA.

CAST IRON GAS & WATER PIPE

MANUFACTURERS OF

**CAST IRON PIPE AND SPECIAL CASTINGS**

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

Alcohol, its Manufacture from Farm Products and De-Naturing. By F. B. WRIGHT.

Price, $1. *For Sale by*

A. M. Callender & Co., 42 Pine St., New York City.

S. PEMBERTON HUTCHINSON, President. H. C. ADAMS, 1st Vice President. CHAS. F. GODSHALL, 2d Vice-Pres. & Treas. HENRY WHARTON, Secretary. C. B. NICHOLS, Assistant Secretary.

**THE WESTMORELAND COAL CO.**

Chartered 1854.

**Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.**

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J., WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

**Principal Office, 224 South 3d St., Phila., Pa.**

**GAS MAINS—SERVICE PIPES.**

Their installation for High or Low Pressure is the work in which we have specialized for years. Because of our Facilities and Experience, many Gas Companies prefer to contract with us for such work, rather than to execute it themselves. It proves to be as cheap in the end. We solicit inquiries. SULLIVAN BROS.,

Telephone Connection. 11 Main St., Flushing, N. Y.

JOHN CABOT, President. GEO. D. CABOT, Secretary.

1412-1428 Adams Street, Hoboken, N. J.

**PURIFIER AND SCRUBBER TRAYS.**

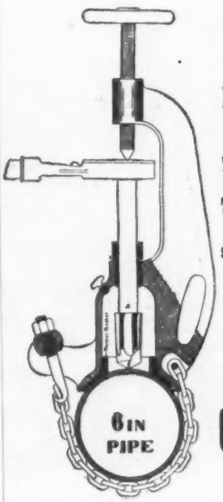
**Church's Patent Trays,**

Reversible; Strongest; Most Easily Repaired.

We also Supply the Cheapest and Strongest

**Reversible Bolted Trays.**

Special Trays for Iron Oxide in Either Style.




**MACHINES**

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

*Machines Sent to any Gas Company for Thirty Days' Trial.*

Send for Circulars.

**GEORGE LIGHT,**

DAYTON, O.

# Standard Oil Company,

GAS NAPTHA DEPARTMENT.

## GAS NAPTHA.

## GAS OIL.

Correspondence Solicited.

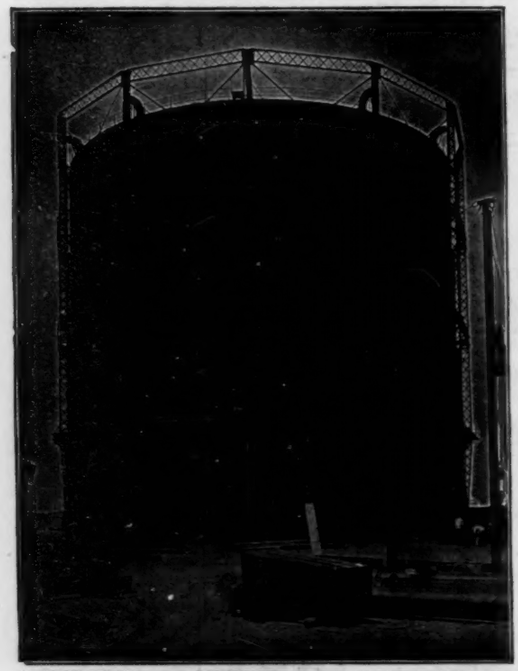
26 Broadway, New York City.

# DAVIS & FARNUM MANUFACTURING CO.,

Waltham, Mass.

**GAS HOLDERS**

**Steel Tanks for Naptha Storage, Machinery for Coal and Water Gas Plants.**



JOHN FOWLER, President. J. SCOTT FOWLER, Vice-Pres. & Treas.

# DEILY & FOWLER MFG. CO.,

39 Laurel Street, Philadelphia, Pa.

ESTABLISHED 1842. INCORPORATED 1908.

BUILDERS OF

# GASHOLDERS,

Single-Lift or Telescopic,

With or Without Steel Tanks.

Oil Storage Tanks, Water Tanks, Etc.

ESTIMATES CHEERFULLY FURNISHED.

CORRESPONDENCE SOLICITED.

# RUBBER GOODS

*For Gas and Electric Plants.*

## *NEW YORK RUBBER COMPANY,*

*Incorporated 1851.*

*FACTORIES: MATTEAWAN, N. Y.*

*MAIN OFFICES: 84 and 86 Reade St., New York City.*

PETER YOUNG, President.
Works:
LOCKPORT STATION, PA.

ESTABLISHED 1864.

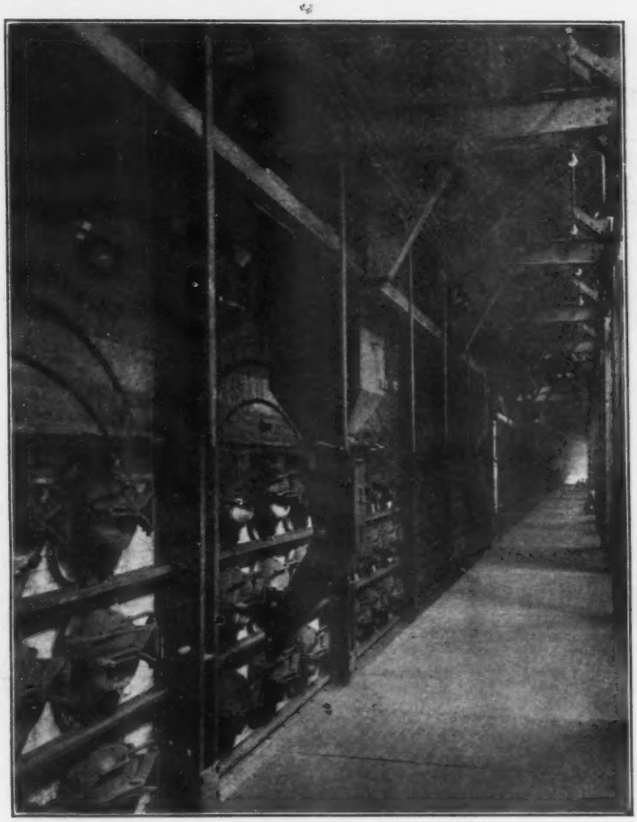
## JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

N. A. YOUNG, Secretary and Treasurer.
Address all Communications to
JAMES GARDNER, JR., CO., Bolivar, Pa.

# Fire Clay Goods for Gas Works.

THE BARTLETT HAYWARD CO.
ENGINEERS & FOUNDERS.
BALTIMORE. NEW YORK.
COAL & WATER GAS PLANTS
GAS HOLDERS



INCLINED RETORTS (CHARGING SIDE).

Western Representative—W. A. BAEHR, Peoples Gas Building, Chicago.

# DIDIER-MARCH COMPANY,

Hudson Terminal Building,

WORKS:
Keasbey, Perth Amboy, N. J.

30 Church Street,
NEW YORK, N. Y.

## DESSAU SYSTEM OF VERTICAL RETORTS,

The Only System in Successful Operation.

**RECENTLY AWARDED THE GRAND PRIZE AT THE WORLD'S FAIR HELD AT BRUSSELS, BELGIUM.**

First Installation in the United States of America,

PROVIDENCE, R. I., 18 BENCHES, 180 RETORTS,

Complete, with

Retort House, Coal and Coke Handling Machinery and Storage Bins.

**NOW IN OPERATION.**

VERTICAL RETORT BENCHES OF THE DESSAU SYSTEM WITH 5,500 RETORTS ARE NOW IN OPERATION AND IN COURSE OF CONSTRUCTION.

If You Desire to Increase Your Earning Capacity, Consult Us.

HORIZONTALS AND INCLINES OF APPROVED TYPES.

Correspondence Solicited. FREDERICK J. MAYER, General Manager.

# THE CHAMBER OVEN.

Charging Coal into a "Chamber" of the Chamber Oven process loses the terrors of labor costs incidental to charging coal in a plant using the ordinary horizontal retort.

The coal, after being crushed when unloaded from the car, is carried by a conveyor to a bin located above the chambers.

From this bin it is fed into charging buckets, operated from an overhead trolley, to the charging doors, two to each "chamber," opening into the top of the "chambers."

These charging buckets measure the amount of coal handled either by weighing or by cubical contents.

Each "chamber" receives a charge of about 5 tons of coal and is then closed for 24 or more hours.

By arranging the operation to permit charging in the morning of half of the coal consumed and the balance in the latter part of the afternoon, an even quality of gas is maintained for the entire period and **the day shift does the work.** The night man only looks after the furnaces and the boiler and acts as watchman.

**"Three men during the day shift, and one man at night, can easily carbonize 100 tons of coal per day."**

That's why we can produce a high quality of coal gas at a lower cost per 1,000 cubic feet than any other known process of coal gas manufacture.

If your output is over 500,000 cubic feet of gas per day, allow us to explain the saving we can make for you each year.

It will be a handsome dividend for your stockholders.

## The National Chamber Oven Co.,

CINCINNATI.

# R. D. WOOD & CO.,

400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

## Cast Iron Pipe.

HEAVY LOAM CASTINGS,

**Dunham Specials,**

**Hydraulic Work,**

LAMP POSTS, VALVES, ETC.,

**Gas Power Plants with Producers.**

BUILDERS OF

## Gasholders.

Single or Multiple Lifts, with or without Metal Tanks.

**PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.**

Cutler's Patent Freezing Preventer for Holder Cups.

Either Straight or Circular Reading Registers

CATALOG 100 FREE

## Pittsburg Meter Co.

Main Office and Works:
EAST PITTSBURG, PA.

New York, 149 Broadway.
Chicago, 256 Madison Street.
Kansas City, 6 West 10th Street
Seattle, 8th and Madison Streets.
San Francisco, 149 New Montgomery Street
Columbia, S. C., 1230 Washington Sreet.

Manufacturers of Gas Meters and Water Meters.

## The Exterior

of Ironclad meters is not private property—but the INTERIOR cannot be copied or used by any other maker than the Pittsburg Meter Company.

The INTERIOR has exclusive features that merit the attention of every gas company desiring an efficient and economical meter.

## THE NEW MODEL PREPAYMENT METER.

SEND FOR SAMPLE METER AND LET US SHOW YOU THE NEW IMPROVEMENTS.

## NEW YORK IMPROVED METER CO.,

306-310 EAST 47TH ST., NEW YORK CITY.

# METRIC METAL WORKS,

MANUFACTURERS OF DRY GAS METERS.

**EXTRA HEAVY TIN METERS AND IRON-CASE METERS**

FOR ARTIFICIAL OR NATURAL GAS.

**TOBEY CAST IRON NATURAL GAS METERS—METER PROVERS.**

**WESTCOTT PROPORTIONAL METERS FOR GAS OR AIR.**

Special Attention Given to Repairing Meters of All Makes.

FACTORY—ERIE, PA. WAREHOUSE—KANSAS CITY, MO.

# D. McDONALD & CO.,

971-997 BROADWAY, ALBANY, N. Y.,

MANUFACTURERS OF

**DRY GAS METERS, STATION METERS, PREPAYMENT METERS, METER PROVERS AND GAUGES.**

## THE GLOVER PREPAYMENT METER,

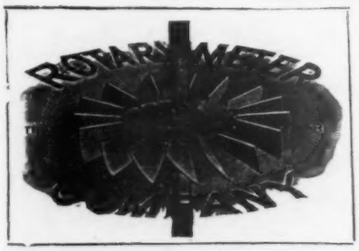
Simple, Strong, Satisfactory.

## THE HINMAN STATION METER DRUM,

The greatest advance that has been made in 20 years in the ACCURATE and ECONOMICAL measurement of gas in large quantities. :: :: ::

NEW YORK OFFICE: 561 West 47th Street. | ALBANY OFFICE: 991 Broadway. | CHICAGO OFFICE: Jefferson and Monroe Streets.

## We can meet your requirements for STATION METERS




On all capacities from 1,500 to 500,000 cu. ft. per hour.

One-half the Cost—One-tenth the Space of Old Style Wet Meters.

When in Need of Station Meters Write

**ROTARY METER COMPANY,**

280 Broadway, NEW YORK.

Our Literature and all information will be sent on request.

## The Sprague Meter Co.

Manufacturers of

**Cast Iron Gas Meters**

for

**Artificial or Natural Gas**

Plain or Prepayment

Lower in first cost and cheaper to maintain than any meter on the market.

Write us for particulars.

**The Sprague Meter Company**

203 Water St., Bridgeport, Conn.

# NATHANIEL TUFTS METER COMPANY,

**455 Commercial St., Boston, Mass.**

## PREPAYMENT GAS METERS,
## WET AND DRY GAS METERS, STATION METERS, ETC.

**REPAIRING OF ALL MAKES OF METERS, AND FITTED WITH OUR PREPAYMENT ATTACHMENT.**

---

## "B" METERS "B"

INCREASED CAPACITY. INCREASED EFFICIENCY.

## THE MARYLAND METER

*PREPAYMENT METERS STATION METERS, METER PROVERS Etc.*

PROMPT AND CAREFUL ATTENTION TO ALL REPAIR WORK

CHARLES H. DICKEY & COMPANY.

*BALTIMORE. — CHICAGO.*

YOU NEED ONE OR MORE OF OUR COMPLAINT METERS!!

---

## METERS, Plain and Prepayment,

**For Artificial or Natural Gas.**

**Repairing All Makes and Attachments Added if Desired.**

**SPECIAL METERS FOR ACETYLENE.**

## KEYSTONE METER COMPANY,

ROYERSFORD, PA.

---

EDWARD H. RODGERS, President. FREDK. C. VINEY, Vice-President and Superintendent. JOHN H. BLYE, Secretary and Treasurer.

# The Standard Meter Co.

(INCORPORATED),

MANUFACTURERS OF

**Natural and Artificial Gas Meters, also Station Meters, Provers, Portable Test Meters, and all other appliances.**

The Pioneers of Large Capacity Meters for Natural and Artificial Gas.

**Office and Factory: 3112-14-16-18-20 North 17th Street, Philadelphia, Pa.**

SOLE AGENTS FOR THE MIDDLE WEST: The National Supply Co. of Kansas, Independence, Kas.

PACIFIC COAST REPRESENTATIVE: The W. F. Boardman Co., 718 Mission St., San Francisco, Cal.

EASTERN REPRESENTATIVE: L. J. Montgomery, 150 Nassau St., New York, N.Y.

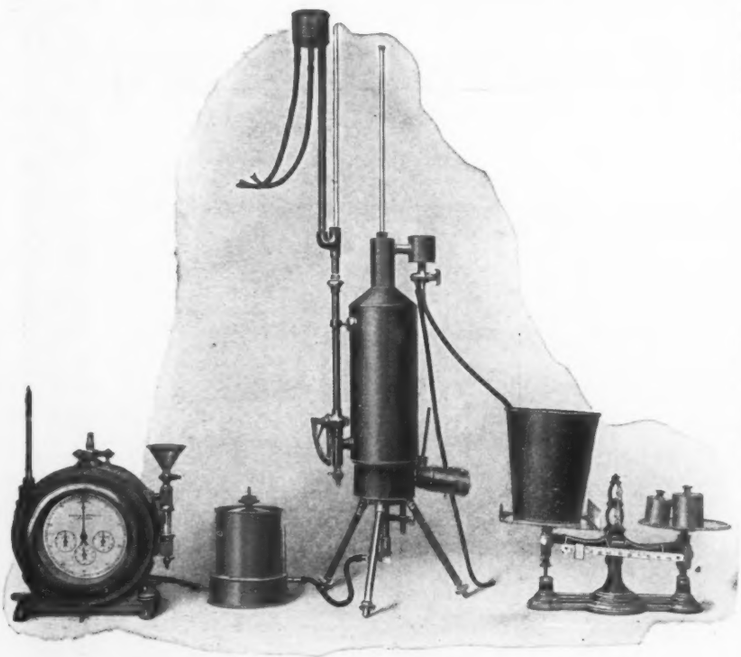
NEW YORK. PHILADELPHIA. CHICAGO.

# THE AMERICAN METER CO.

ESTABLISHED 1884.

"WE AIM TO PLEASE."

## WET and DRY GAS METERS,



Experimental and Station Meters, Pressure Gauges, Meter Provers, Drip Pumps, Service Cleaner Pumps, Service and Meter Cocks, Lamp Cocks and Torches, Photometrical Apparatus and all articles for the distribution, measurement and testing of gas.

**WE WERE THE ORIGINATORS AND FIRST MANUFACTURERS OF THE PRESENT TYPE OF OPEN TOP METERS.**

CIRCULARS AND PRICE LIST ON APPLICATION.

Sole Manufacturer of the

## HINMAN CALORIMETER.

This apparatus is of the same general design and operates on the same principle as the well-known Junkers Calorimeter, which has heretofore been regarded by gas experts as the most satisfactory form of calorimeter in use.

We have, however, made some valuable improvements in the instrument, with a view to overcoming certain troublesome features in the original, making it easier to operate, and we find these improvements very acceptable to users of the calorimeter.

This Calorimeter, with its accessories, is constructed in accordance with the recommendations made by the Committee on Calorimeters of the American Gas Institute. It also has the approval of the Public Service Commission of the Second District, Albany, and has been found by them to give accurate results.

NEW YORK, 11TH AVE. AND 47TH ST.

# HELME & McILHENNY,

Established 1848. 1339 to 1349 Cherry Street, Philadelphia, Pa.

MANUFACTURERS OF

## Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

## PREPAYMENT GAS METERS.

**Our Own Patents. Strong. Simple.** PROMPT ATTENTION CORRESPONDENCE SOLICITED.

## COX'S LOW PRESSURE COMPUTER, - - - - $2.50
## COX'S HIGH PRESSURE COMPUTER, - - - - 5.00

For Sale by AMERICAN GAS LIGHT JOURNAL, - 42 Pine St., New York City

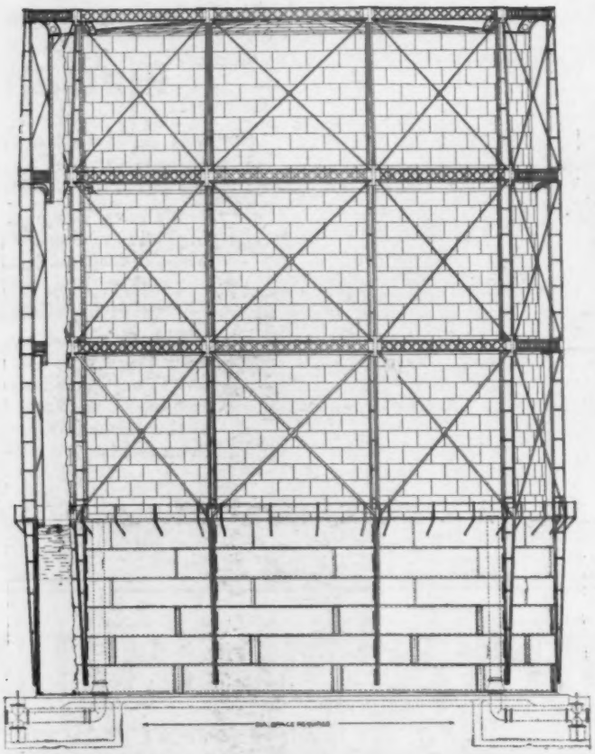
# THE WESTERN GAS CONSTRUCTION COMPANY

WORKS AND MAIN OFFICE FORT WAYNE IND U S A

## GAS ENGINEERS

EASTERN OFFICE NEW YORK CITY. WESTERN OFFICE SAN FRANCISCO.

Broad Exchange Building. 901 Indiana Street.



**CONTRACTS RECEIVED THIS YEAR.**

| | | | | |
|---|---|---|---|---|
| Jenkintown, Pa..... | 500,000 cubic feet | capacity | Steel | Tank |
| Madison, Wis..... | " | " | " | " |
| St. Louis, Mo..... | " | " | " | " |
| St. Louis, Mo..... | 60,000 | " | " | " |
| North Trafford, Pa .. | 5,000 (2) | " | " | " |
| South Elizabeth, N J. | 5,000 (2) | " | " | " |

CONTRACTORS AND BUILDERS

EVERYTHING FOR A GAS PLANT